Electricity on the farm

A Monthly Magazine for the Progressive Rural Family

January, 1931

U. S. Department of Agriculture

BUREAU OF PUBLIC ROADS

This Edition Includes a

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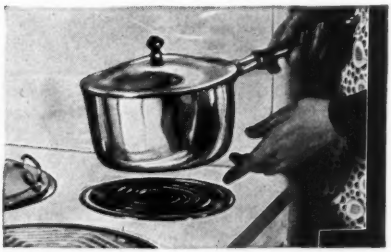

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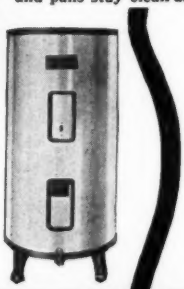

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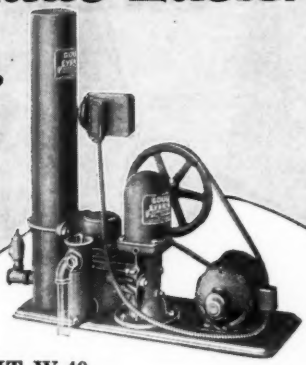

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Electricity on the Farm

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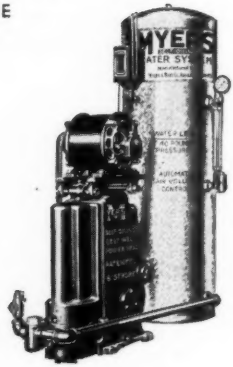

Fig. 2621
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A complete Water System Unit for wells over 25 feet in depth. Powered by electric motor and entirely automatic in action — self-starting, self-stopping, self-oiling. No attention required. Delivers water from tank to faucet under 20 to 40 pounds pressure.

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Or a Hotpoint electric iron will relieve much of the old drudgery. All these time- and labor-saving devices are inexpensive to buy and ready to serve you at the touch of a switch.

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Send for the new booklet "Electric Helpers for the Farm." Address Room 317, Building 6, General Electric Company, Schenectady, N. Y.

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GENERAL ELECTRIC

ELECTRICITY ON THE FARM

JANUARY, 1931

There is no farm poultry flock so small that electricity cannot be used profitably, in some form or other, in connection with it. Below are given some of the more common uses of electricity in poultry raising.

Easing Up the Work in Poultry Raising

In no other branch of farming has electricity done more toward reducing drudgery and improving the product than in poultry raising.

Note, for example, the following list of equipment, electrically operated, which is found in the more modern poultry farm, and then consider the better products produced by them and the saving in labor which they represent:

Incubators, brooders, feed and bone grinders, sprouters, water warmers, lights, egg candlers, egg cleaners employing sand blast, scalding tanks and burglar alarms.

Not only do electric incubators and brooders produce better results than the old kerosene or coal heater type but, in connection with use of electric lights, the brooders eliminate cannibalism and the night lights prevent overcrowding and consequent smothering of the young chicks.

The benefits of electric illuminating of hen houses are well appreciated. Such lights increase the egg production at the time when eggs bring the highest price, and by the use of automatic time clocks, lights can be turned on and off without the necessity of any one being on hand to do it. And now ultra violet lights are finding a place in poultry raising.

It is hard to say just how much the use of electricity will increase the capacity of a particular poultry farm, without increasing labor, but the percentage is large; and the time saving element in connection with electrically operated equipment is tremendous.

It is no wonder that progressive poultry farms are using electric current on a rapidly increasing scale.

MODERN MILKING METHODS

By E. R. MEACHAM

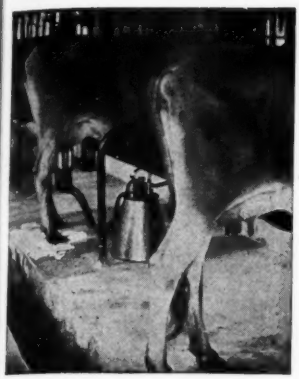
A FEW years ago men, digging among the ruins of an ancient Assyrian city, unearthed a clay tablet depicting a man milking a cow. It is perhaps the earliest record of the dairy industry. The man sat behind the cow with her tail thrown over his head and hanging carelessly down his back. In all the centuries from that day to this, about the only progress we have made in hand milking is to move the man 90 degrees to the east.

Improved Rapidly

But since 1905 when the milking machine developed by Lawrence and Kennedy of Glasgow, Scotland, and improved by Burrell of New York, was put on the American market, progress in machine milking has been rapid and continuous. As in the case of every other invention that has had a revolutionary influence on long established methods, the milking machine has been and is still the subject of a perfect storm of argument. Just as sincere people contended that the steel plow would poison the land, their descendents have feared that a mechanical milker would injure the cows or contaminate the milk. Correct opinions of modern machines cannot be based on familiarity with machines of even a few years ago. For the latest types are carefully designed to overcome the faults of their predecessors as well as to modify milking methods.

For example, one manufacturer has remodeled his machine so that the tubes on his milker are now only four or five inches long. That brings the milk pail very close to the udder so he hangs it on a strap over the cow's back.

Another recent development is the magnetic control of the pulsator. The company which has recently made this improvement previously used a double pipe line installation. To avoid the expense of an extra set of pipes and stall cocks, they have put a small elec-



A milker at work.

tric generator on their vacuum pump and make simple electrical connections from it to the milking machine head. The pulsator moves in response to the flow of current through these connections.

A Stationary Milker

On the experimental farm operated by the United States Department of Agriculture at Beltsville, Md., Mr. R. R. Graves has developed some important changes in methods of milking by machinery. There the milker is stationary. The cows come to the machine to be milked. The milk is drawn into a big glass jar hanging on a scale above the cow. The attendant can plainly see when the milk ceases to come. Then he records the weight, opens the valves that let the milk flow to the milk room, and is ready for the next cow. There one man does all the milking and he has milked twenty-nine cows three times, and twenty-five cows twice in five and a half hours total time. This is at the rate of 25 cows an hour.

But down in New Jersey where the Walker-Gordon Company have 1,600 cows on one farm, they have carried the process a step farther. They use a similar milking device but they have put their milking stalls on a revolving platform that will hold fifty cows at a time. As each cow steps on to the platform, an attendant washes her, dries her with hot air, attaches the teat cups and the milking goes on as she continues her ride around the barn. Then her stanchion opens, she steps off the revolving platform and another cow takes her place. The turn table makes one complete revolution in twelve and a half minutes. In that time two men clean and milk 50 cows.

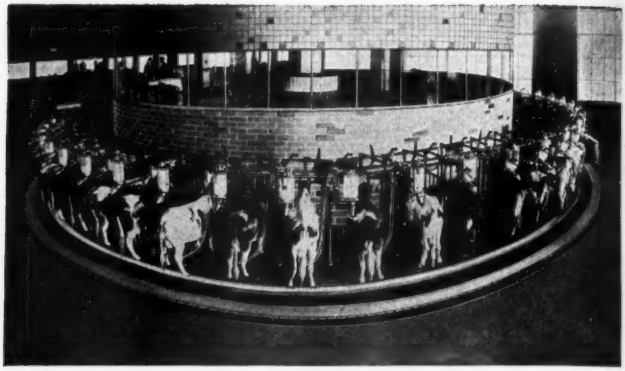
Reducing Production Cost

The Walker-Gordon Farms where this method is in use are the oldest and largest producers of certified milk in the world.

The effect of all these developments is the same. They constantly make it easier and more practical to lower the cost of dairy production by substituting cheap mechanical power for human labor which is often the most expensive item in the cost of milk. The actual amount of time saved by this substitution has been studied by several experiment stations.

In Kansas the average time for 900 milkings was 7.63 minutes for milking each cow by hand. For

One of the short tube milkers.



Photographic reproduction of the Rotary Combine Milking System.

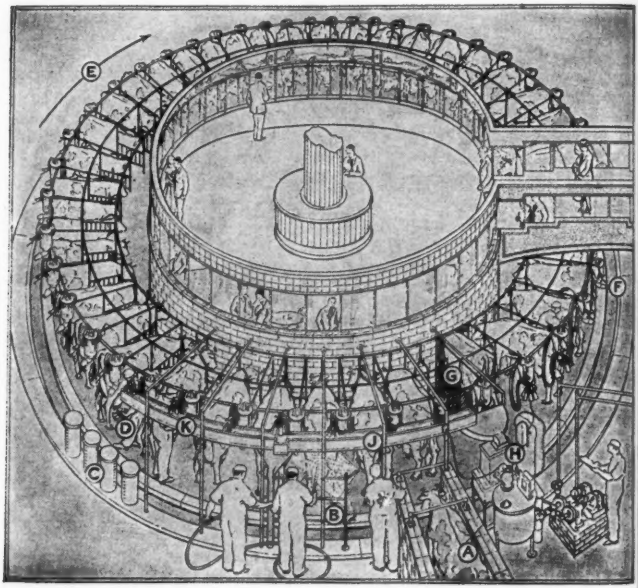


Diagram showing how system works.

(A) Cows step on moving platform; (B) washed almost automatically; (C) dried by hot air; (D) milking machines put on; (E) platform revolves 15 feet per second in this direction, completing a revolution in 12½ minutes; (F) milking machines taken off; (G) cows step off platform and go back to barns; (H) milk automatically dumped from Pyrex jars, weighed, and piped to the bottling room; (J) milking machine thoroughly rinsed in cold water; (K) milking machine sterilized by hot water before being used on another cow.

283 milkings by machine, the time spent for each cow was as follows:

Setting up machine	0.245	min.
Moving machine	1.30	"
Stripping the cows	1.715	"
Washing the machine	0.325	"
	3.585	"

These figures show that even when the time spent in caring for the machine was considered, mechanical milking saved the attendant over four minutes a cow per milking or four hours per cow per month. The Kansas report does not mention the size of these herds, but the time spent in caring for the machine is proportionately less for large herds than for small.

A Time Saver

This point was illustrated in tests at the Iowa Station where the total time of milking and caring for utensils was compared. In a herd of 17 cows one hour's work with a milking machine was equivalent to 1⅔ hours of hand labor. But in a herd of 22 cows a man with a machine could do as much in one hour as a hand milker could do in 2¼ hours.

Several years ago the Illinois Station published a bulletin on the comparative expense of mechanical and hand milking. The bulletin summarizes studies of the cost of milking 860 cows by machine on 32 farms with the cost of milking 850 cows on 34 farms by hand. None of the milking machines was operated by electric power so the costs included fuel, oil, batteries and use of buildings as well as interest, depreciation and repairs on engines and milkers, sterilizing solutions and insurance. Farm labor was included at 17½ per hour. On this basis the annual expense of caring for a cow when mechanical milkers were used was:

Man labor	81.45	hours
@ 17½		14.26
Power expense		2.46
Mec. Milker expense		1.42
		$18.14

Where milking was done by hand it took 133.9 hours of labor worth $23.44, or $4.80 more than the average expense where the machine was used.

The Illinois figure of $2.46 per cow per year as a total expense for gas engine power is very interesting in comparison with the results of the Kansas tests mentioned above. Illinois found that it took $1.48 for kerosene and gasoline and batteries to provide power for milking a cow one year. On the Kansas farms it took an average of 32 KW hours of electric energy to do the same work. The cost of this energy is not given but at 3c it would be worth 96c per cow per year. The depreciation set-up for the engines indicate that their probable life would be about six years. It is common knowledge that a motor will last a great deal longer.

The attention necessary for engine or motor was not considered in these experiments but Emet N. Hopson writing to Hoard's *Dairyman* about his eleven year's experience with a milking machine says:

"The electric motor saves at least five or ten minutes daily in starting the milker. Since its installation in 1925 the electric motor has needed no attention except proper oiling and cleaning the commutator brushes."

Do the Advantages Gained Lower Milk Yield?

The question still remains whether these advantages in time saving and production costs are secured at the expense of lower milk yield or any other injury to the cows. Here again the experiment stations have made careful and impartial studies. At Iowa, for example, five groups of from 13 to 25 cows were milked during alternate periods by hand and by machine. There were of course, many variations in production, but when all the tests were averaged it was found that when milked by machine the cows gave two-thirds of an ounce more per day than when milked by hand. This difference is too small to be of any significance so the only conclusion that we can draw from these experiments is that machines will secure as much milk, but no more, than good hand milking. In fact, in these tests there were 45 cows which produced more milk during machine milking periods and 39

that gave more when milked by hand.

Careful observations at Iowa and the other stations studying this question, do not show that a properly operated machine is responsible for drying up the cows or injury to the udders. But it must be intelligently operated. Iowa found that the machines are ordinarily left on too long. In their tests where the milker pails were placed on scales during the milking process, they found that most of the milk was secured during the first three minutes but that the time varies somewhat with the quantity of milk produced. They also found that the machine was most efficient with high producing cows; with low producers it left 20% of the milk in the udder while the better cows the strippings amounted to only 4%.

Effect on Quality

The effect of the machine on the quality of milk itself depends almost entirely on the methods used in washing and sterilizing it. Dirty milking machines have caused a great deal of trouble, but the highest quality of milk can be produced where they are properly cleaned. This requires a good supply of hot water which will be most convenient if it can be heated right in the milk room. The use of hot water is not only a sanitary precaution but is necessary to remove the butter fat from the rubber parts. Contrary to the old idea that boiling water would spoil the rubber, milker manufacturers now recommend it as an aid in keeping the rubber in good condition, thus improving not only the sanitation but the actual operation of the machine.

Sturdy and Dependable

The development of modern milking machines, pipeline or portable type, is making them constantly more sturdy and dependable. General experience indicates that their use in herds of 20 to 25 cows will save one half the labor and one fourth the cost of milking. The best assurance of success for the man with a milking machine is to become thoroughly familiar with his machine, and to keep it in perfect mechanical and sanitary condition.

Accommodating

Teacher—"You bad boy! I wish I was your mother for about twenty-four hours."

Bad Boy—"All right, teacher, I'll speak to dad and maybe I can fix it."

Bock—"What brand of cigarettes do you smoke."

Jock—"I dinna ken. I'm tae polite to ask."

A modern milkmaid.

BETTER CHICKS

By C. D. BYRNE

DEFINITE proof that electricity can be profitably and efficiently applied to another use on the farm is shown in a two-year test on electric brooders for chickens made by experimenters at Oregon State College.

In accurate comparative experiments with coal burning and kerosene burning brooders, five different types of electric brooders proved very satisfactory as "foster mothers" for both chickens and young turkeys. The cost of heat on the electric brooders was found to be about the same as for the other types but they proved to be great labor savers, eliminated a great fire hazard that exists in the coal and kerosene burning brooders, and with their automatic controls gave a very uniform temperature.

Electric Mother Taking Lead

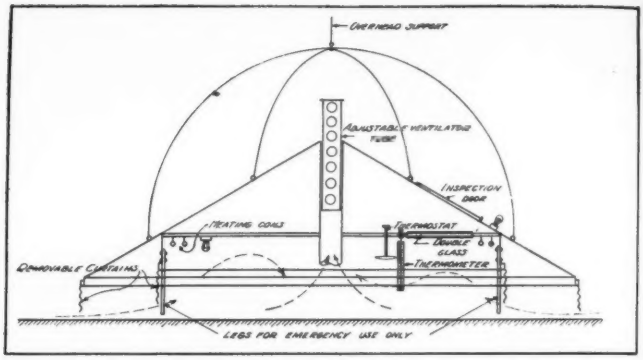
The chicks mothered by electricity also thrived and in some instances made gains that surpassed the weight increases made by the chickens in the other fuel burning brooders. Mortality in the electric brooders was also low.

Accurate cost figures kept both years show advantages for the electrically heated machines. The first year one of the electric brooders was operated during the six-weeks' period at a cost of eight-tenths of a cent per chick while the fuel cost for the coal stove was one and three-tenths of a cent per chick. Electricity also proved the most economical the second year with one of the electric brooders operating at a cost of one and six-tenth cents per chick, as compared to three and seven-tenths cents per chick for the oil brooder.

No Serious Results

One of the common objections to electric brooders—the hazard of power interruptions during the brooding period—proved to be of little or no consequence in the test. On one occasion the power went off on the fifth day of the test for one hour with no serious results. By confining the chicks beneath the brooder and adding sack covering the temperature inside dropped only six degrees in one brooder and ten degrees in the other. This power interruption came in one of the most severe cold spells that Oregon has experienced in recent years. Another two-hour interruption in milder weather caused only slight drops in the temperature.

The extreme cold spell during the winter of 1930 was seized upon by the experimenters as a splendid chance to test the efficiency of the electric brooders under severe conditions. Seven hundred chicks



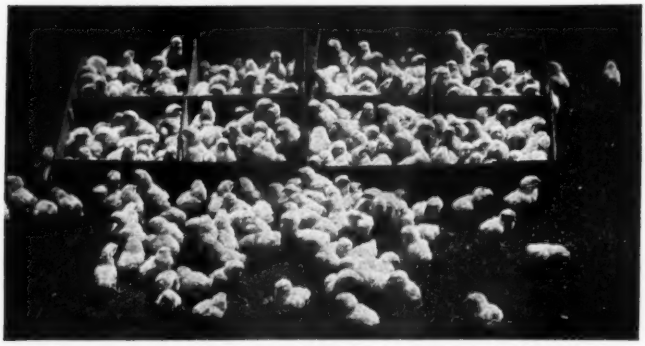
Sketch of No. 3 electric brooder which gave very good results in the electric brooder tests at Oregon State College.

were ordered and arrived on a day when the thermometer registered 28 degrees. For the first ten days of the test the range of outside temperature was from 4 to 29 degrees. Yet without further heat in the poultry house the electric brooders proved capable of caring for their feathered families with only normal losses and with good gains made by the chicks.

One type of electric brooder, number 3 in the experiment, proved especially efficient in the tests both years. It ranked first in fuel economy the first year and second in the second test. In the percentage of chick losses it was first one year and fourth the other. Both years it ranked first in the rate of gain made by the chicks. This brooder was conical in shape, constructed of galvanized iron with a one-inch wood ceiling forming an air space in the top. It had an outer rim and curtain and an inner circular section with a second curtain. The heating coils, of the non-glow type, were fastened to the ceiling of the brooder. All the heating elements were controlled by a thermostatic switch.

The experiment on the electric brooders was conducted with the co-operation of the Oregon Com-

(*Continued on page* 18)



That electricity is proving a superior mother over previous methods employed may be judged by these sturdy, healthy chicks.

From Farm to Factory With an Electric

DAIRY WATER HEATER

By P. R. KIRKPATRICK

The story of this home-made water heater is particularly interesting in that the device was practically developed on a farm, but has since been taken over by a manufacturer who is now building it. While it is by no means the only satisfactory heater on the market, it has proven fit for the work assigned to it. The cost of building it at home does not take into account the labor and skill required. Furthermore, the home-made heater is neither as durable nor as finished a product as that put out by the factory.—Editor.

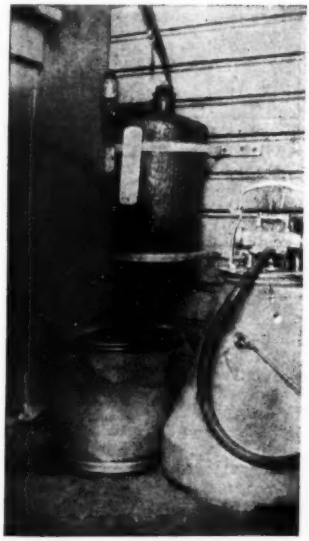
THERE has long been felt a need for an efficient electric heater that is within the reach of all dairymen. One can be made by any farmer in a few hours that combines all the necessary features but still without a great outlay of cash or labor.

Capacity and Make-up

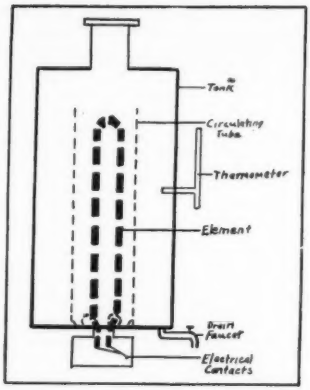
The heater illustrated has a capacity of two gallons and one pint, or sufficient water to sterilize a two unit machine. A 1000 watt immersion type heating element is used, which will raise the temperature to 165° F. in thirty minutes. The tank is made of 20 gage lead-covered sheet iron, seven inches in diameter and thirteen inches long. In the center a tube eleven inches long is located with holes in the bottom and open at the top to insure circulation. The element extends through the bottom into this tube. The heater will operate without this circulating tube, but it is recommended to insure uniform temperature at all heights in the tank.

The boiler thermometer is placed in the side of the tank somewhere near the center. A drain faucet is located in the bottom at the front. A two inch opening is in the top with a small hole in the cap to allow expansion when the water is heating. Threads for attaching the various fittings to the tank are provided by riveting and soldering lock nuts of the proper size to the tank.

The tank is insulated with



The water heater shown above is equipped with a 1,000-watt immersion type heating element and heats sufficient water to sterilize a two-unit machine in thirty minutes.



Cross sectional view, showing general make-up.

powdered asbestos. The tank should first be covered with chicken netting to insure the insulation sticking to the tank. The asbestos should be applied in coats about one-fourth inch thick until at least an inch covers the entire tank. A small amount of cement mixed in the last coat will help to harden the covering. A covering of cloth or canvas should be put on with flour and water paste and painted with shellac or paint to prevent water from soaking the asbestos.

The total cost of the tank illustrated is $15.93 for the various items, as follows:

Tank 7x13 in. with circulating tube	$2.85
"Hairpin" Imersion type element, 1,000-watt	9.00
'Angle" Thermometer	1.25
Faucet	1.00
¾ in. Street Elbow	.08
2 in. Cap	.14
2x3 in. Nipple	.28
20 lbs. Asbestos	1.00
Chicken netting	.08
Canvas	.10
Shellac	.15
	$15.93

If four gallons of water are needed, a tank ten inches in diameter and twelve inches long will furnish the amount. For either a two or four gallon tank, a 1000 watt element will heat fast enough. Whenever 220 volt service is available at the milk house, an element for this voltage should be used.

The consumption of the heater pictured is thirty kilowatt-hours per month. This is for heating two gallons of water two times each day.

Traveling Some

Wife (reading): "It says here they have found a four-legged sheep in the Himalaya Mountains that can run forty miles an hour."

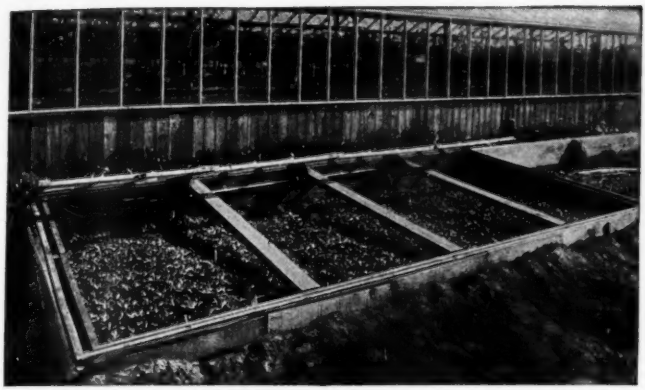
Her Hubby: "Well, it would take a lamb like that to follow Mary nowadays."

Better Chicks

(*Continued on page* 16)

mittee on Electricity and Agriculture, of which James T. Jardine, director of the Agricultural Experiment Station, is chairman. Prof. A. G. Lunn, head of the poultry department, supervised the poultry phases of the tests, assisted by Prof. F. E. Fox. The electrical and engineering features were in charge of Prof. F. E. Price, of the agricultural engineering department.

One of the brooders used in the experiment. It excelled the coal and kerosene burning brooders and was rated among the most economical and efficient of electric brooders.



Here we see Mr. Collin's Thermostatic Controlled Outdoor Electric Hotbed.

Electricity Serves This Farmer by

PUSHING PLANT GROWTH

By HERBERT COLLIN

This is the second of a series of two articles describing some uncommon uses of electricity on a ten-acre flower and truck farm near Centerline, Michigan. The author, who is the owner and operator of the farm, outlines his experiences in an interesting manner.—Editor.

AT the present time manure with which the average hotbed is constructed is a scarcity that automobiles don't want to help out, and we have to try something different. You can go to the city of Detroit and not pick up a forkful of manure to make hotbeds as the old style required. So we wanted to put electricity to use for the benefit of another experiment. We didn't know just what type of heating elements we would need or what type of construction we would need, but we built an oven and put it to work. On the bottom was built a 2″ x 2″ board platform; on top of that we had another 2″ x 4″ platform, giving a 4″ space below in which to place the heating elements. Above that we put the average hotbed construction with a double wall instead of a single wall, leaving an air space of 1″ between. We covered all this with tar paper, and started the bed about the first of April this year. All of the material was brand new and the heating elements were made of three sections of the Electrochef oven element hooked up in series as one element. Even then there was more heat than we needed, but this heat was not evenly distributed, and it would be so hot over the center that it would burn the

roots of the plant. We cut down this heat by using the three in a series, giving an even distribution of heat under the sash. It took twelve of those heating elements to make up the heating capacity we wanted under our four-sash hotbed. The total cost of this outfit, as you may see it today, is about $100, but the heating element is the largest factor, costing practically one-half. Take into consideration the thermostatic control, the relay, and double board construction and then we have everything but the sash. At the time we built this we couldn't buy the regular cypress sash in this locality. We, therefore, telegraphed to New York and it was sent out by express in order to have the hotbed in operation as soon as we could get it. All these expenses were added in on the cost of this construction.

Any one that has the old material they have used for hotbeds can easily make one at a much reduced cost.

And Then Another

Then I ran on to another experiment, and haven't really completed that. Mr. Mason called me up one day and said: "What do you think of flood lighting?" "What do you mean, flood lighting?" I said. "Lighting up your fields the same as parking lots in the city." "You are hitting me pretty hard," I said. "I have no information. Give me twenty-four hours to think it over." Next night Mr. Mason called me: "What do you think of the lighting system?" he said. "I think it is all right." "What do you mean—it is all right? A man can't work day and night all the time." "I agree to that," I said, "but I have other reasons. If you want to get this information, come down." So Mr. Mason came down to see why I would try field lighting. It is a new proposition. I can't give all the facts on it at the present time, but we can give a few of these at present. Most of us here are market gardeners or florists. The market gardener knows if he goes out and tries to cut green crops—lettuce and so on—about 10 o'clock in the forenoon, it is impossible to get one bushel of it cut without having two bushels in the basket without your seeing where it has gone because of its being wilted. We have noted many times the market gardener—in order to try to get green products down to the market fresh—drives his motor truck to the garden and cuts by the headlights. I had all these things in mind at the time I figured on this lighting. I am not in the market gardening as heavy as a lot of my neighbors are, but the situation is practically the same as when we go out in the heat of the day to cut flowers.

The heating element, construction of which is shown above, is made up of three sections of Electrochef oven element connected in series as one unit.

Giving the Best

We might say that we make our living by handing out bouquets—not getting them. We have to grow them in order to get them. In order to try to make a living, it is essential to try, if possible, to give the people who are buying the bouquets the best we can for their money, and in order to try to give them the best, we were trying to get away from the bouquet that has wilted before the cool of evening sets in. At the present time, we have not many flowers under lighting. We did not think that the market conditions this year would warrant putting in many flowers for cutting and making bouquets—that is why

we did not put in many of them. Some years are good, and others are not so good—this is one of the years which are "not so good" for cut flowers. So we have to do the next best thing and put the best we have in what we can sell.

Lights for Night Cutting

When Mr. Mason came down here to get my idea on lighting, I told him these things, telling him at the same if we could come out and cut our flowers after the dew had begun to settle, more could be cut. If we could cut flowers in the field by electric light and put them in the icebox and chill them, we would have much better flowers with much better keeping quality than ordinarily. After working this proposition over for a while, we decided on what would be necessary. Mr. Mason came out with engineers from different departments of the Detroit Edison Company and they studied what would be needed. They decided on the type of light, distance of the lights from the work, and then the wiring that would be necessary. When the cultivator was worked on the same piece of ground, we needed only two wires. The lights take one-half the voltage the cultivator takes, and we had to fix that by putting three wires in the field. Two of those wires are used for lighting—one "hot" wire and one neutral. The two top wires, or power wires, make the 230-volt power used for the motor in the cultivator.

Maintaining Quality

We have found that cutting our flowers late at night, and putting them in the refrigerator, gives us better flowers, and a flower with a keeping quality that well pays us for the cost of the electricity consumed.

Results on dahlias, one of the most difficult flowers to keep, show, without doubt, that a refrigerator can be used with practical and profitable results to keep flowers for at least five days.

Another advantage is this: Over a week ago, on a Friday, late in the evening, we cut a lot of dill and took it to market. The average price at that time was 5c a bunch, or six for 25c. We did not cut the price in order to unload the dill, but held it and it did not sell. Saturday night we came home with about one hundred and fifty bunches of dill, put them in the refrigerator and on Tuesday morning went to market with that same dill. And this same dill, that they would not take at six for 25c before, now sold rapidly at 5c a bunch. If we had not had the refrigerator, we would have lost on that about $7.50. The cost of operating the refrigerator, which is probably six or eight times larger than the average home box would be, is about 10c to 12c a day, according to the temperature of the weather.

There are a number of other applications of electricity which we have tried, or are going to try. For example, we have used a cultivator driven by electric motor. Current is supplied by a portable cord attached to power circuit on pole in center of plot, and the cord automatically played out or withdrawn as the cultivator moves away from or approaches the pole.

We are also planning to employ "artificial sunlight" to speed up growth of plants during the winter and early spring seasons.

Clean the Milking Machine

The use of milking machines in commercial dairying is increasing, and in order to assist dairymen to keep milking machines in sanitary condition, so that the quality of the milk produced will be high, the Bureau of Dairy Industry of the U. S. Department of Agriculture has issued a bulletin on the subject. The publication is Farmers' Bulletin 1315-F, "Cleaning Milking Machines." A copy may be obtained free from the Office of Information, U. S. Department of Agriculture, Washington, D. C., as long as the supply available for free distribution lasts.

Mrs. (showing husband expensive fur coat): "One really can't help but feel sorry for the poor thing that was skinned for this!"
Mr.: "I deeply appreciate your sympathy."

G. W. Kable

National Rural Electric Project

READY FOR VISITORS

By GEO. W. KABLE

TWO years ago an announcement was made of the establishment of the National Rural Electric Project near Washington, D. C. Very little has been said about the Project since that time. A crew has been at work, however, developing the project which is now ready for inspection.

The National Project has two functions. One is to carry on investigations in the development of new or improved electrical equipment and processes. The other is the demonstrating of practical farm electrification and the observation and study of the economic and sociological effects of electricity on farm life.

An Experimental Community

Five farms have been selected in the Sandy Spring district in Maryland. Sandy Spring is about twenty miles from Washington, and is one of the oldest and best organized farming communities in the vicinity of the National Capitol. The farmers club has a continuous printed record of its meetings for the past eighty years. The community boasts a Mutual Fire Insurance Company, a savings bank with deposits of two and a half millions of dollars, an accredited high school, a county hospital and a large number of clubs and other organizations. There are several paved highways from the district to Washington, and also to Baltimore which is about thirty miles north.

The five farms in this district selected for electrification are not show places. They are typical of the Middle South and might easily be duplicated in most any state in the Union. Many of the buildings and fences are old and the farming methods are those which are common in this territory. The farms are owned by the operators all of whom are dependent upon the farm income for a livelihood. The people on the farms are just good average folks like most of the rest of us. They have entered into the spirit of our undertaking and most of them are enthusiastic over the use of electricity on their farms.

The first man on the job, and the one responsible for getting the National Project organized and started, was Mr. L. C. Prickett, Assistant Director of the Committee on the Relation of Electricity to Agriculture. The next man employed was Mr. B. B. Powell, a Missour farm boy with a Masters degree in Economics and Sociology from the University of Maryland. Mr. Powell has been in close touch with all of the farms since their selection and is making a detailed study of the social and economic aspects of rural electrification. Accounts of farm methods and income for several years back have been tabulated. Similar records are being kept during the transition to the use of electricity. The effect of electricity upon the standard of living, participation in social affairs, the amount of leisure and the net income is being obtained. The observations also include such factors as the number of steps

taken in house work before and after electrification, the effect of electric ranges as compared to wood ranges on the summer temperature of the kitchen, and the ease and pleasure of doing house work with electric equipment.

Mr. A. V. Krewatch is the electrical enginoor for the Project, and has charge of the installation and special tests of equipment.

Install Equipment Gradually

The installations of equipment have been made gradually. In most cases the installations have extended over the two year period and are not yet completed. Our purpose has been to disturb the regular routine of farming as little as possible and not to install equipment until the farmer himself was convinced of its value.

All of the cooperating farmers have paid for their line construction, and all are paying the regular rates for electricity in their territory. Part of the equipment has been purchased outright by the farmers, and part of it has been loaned with the understanding that it will be purchased if its use is justified.

Most of the equipment installed on the farms has been shown to be practical elsewhere. In a few cases we are doing some experimental work on new equipment and appliances, the economy of which is questionable. These are in the minority.

The lighting installations were designed by the illumination engineers for the three national lamp works. They represent the very best experience in farm lighting without the use of costly fixtures.

All the common types of wiring were used on the different farms. Every farm has been provided with adequate wiring, i. e., entrance switches, fuses and wires large enough to care for all present equipment and anticipated additions without serious drop in voltage. The smallest entrance switch is of 100 amperes capacity. One set of buildings has a knob and tube job. Another is wired with BX, a third with Romex and the other two have combination systems. All wiring was done strictly according to code and has been inspected and passed. Detailed records of the costs of wiring have been kept and will be published at a later date.

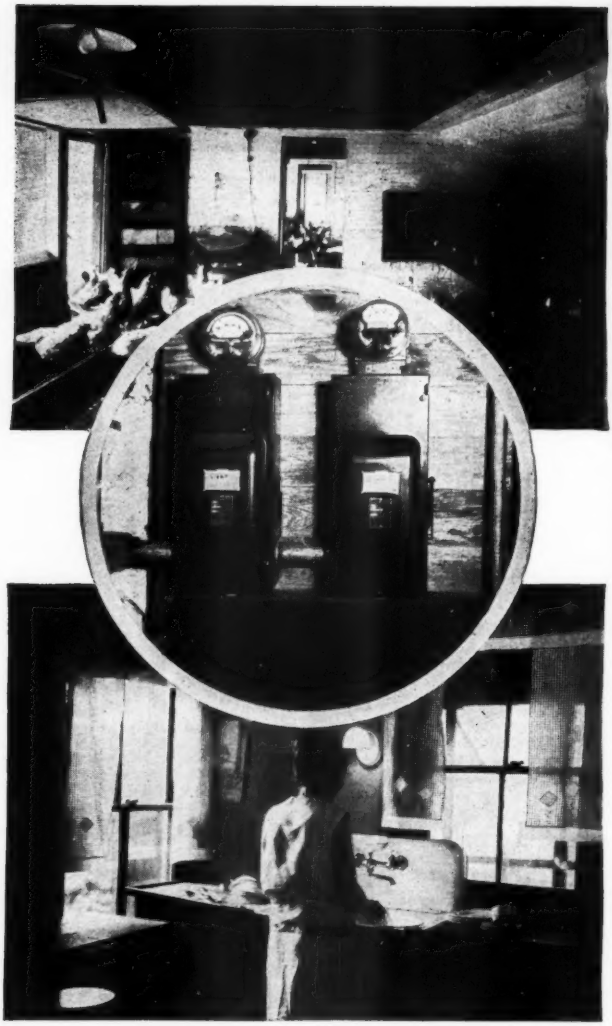
Every farm is equipped with an electric refrigerator, an electric range, water systems and all of the ordinary appliances such as washing machines, irons, ironers, vacuum cleaners, sewing machines, waffle irons, toasters, percolators and similar equipment. We will mention a few of the installations which may be of particular interest.

The Farm Kitchen

In equipping the farm kitchens, special attention has been given to the lighting and the arrangement of these rooms. It is our belief that every kitchen, which makes use of electric equipment, should have that equipment so placed that it will save steps and give the maximum satisfaction to the user. Three of the five farm kitchens have been completely rearranged. The result is not only a saving of steps, but a large increase in the frequency and breadth of smiles.

The Aitcheson kitchen, for instance, has an automatic electric range, a five gallon electric water

One of the electrical smiles of J. L. Aitcheson, a farmer of the National Rural Electric Project group.



Electricity on the Farm—From the Henhouse to the Kitchen

Upper: Electric lights and water heater make this henhouse a modern one. The heating unit is shown in the background. Center: The light and power meters and service switches on these farms are of ample size so that future expansion can be taken care of easily. Lower: Mrs. Aitcheson at work at her up-to-date sink which is equipped with running water, a work light directly above, and other convenience features.

heater in combination with the range boiler, an electric refrigerator, an electrified kitchen cabinet, a sink with built-in drainboards and storage space for pots and pans, and a lighting system that eliminates shadows and does not hurt the eyes. The old sink has been placed in the milk room which saves bringing the milk utensils to the kitchen for washing.

The Thompson kitchen has a combination sink and dishwasher in the middle of the room. The cabinet, which supports the dishwasher, was built at the local mill and contains drawers with partitions for kitchen cutlery and utensils. The drawers may be drawn from either side of the cabinet. The wood range is on one side of the room and the electric range on the opposite side, making a combination summer and winter kitchen by simply working from the opposite side of the sink. In this house the wood range is needed for heating the kitchen in the winter time.

Electrified Dairy Farm

On the dairy farm, owned by Mr. J. T. Seibel, will be found a milking machine, an electric fly spray gun, electric clippers, 5 hp. utility motor used for cutting ensilage and grinding feed, a hammer type feed grinder, a vertical batch feed mixer, electric refrigeration plant, electric water heater, solar water heater and electric fly screens. An electric sterilizer will be added to this equipment when a satisfactory design has been worked out.

The equipment on the fruit farm of Herbert E. Thompson includes a stationary spray plant, a modern apple grader and an electric vegetable washer.

The poultry farm and hatchery, operated by Mrs. R. P. Hines and Sons, has a Mammoth incubator, a compartment type incubator, 4 electric brooders an electric storage brooder, a Sunlamp for the brooder house and several electric hotbeds. The Hines farm also has an interesting combination of underground and overhead cable wiring.

A complete underground wiring system has been installed on the J. W. Jones farm. It includes 1,200 feet of 4,000 volt primary cable and an underground secondary wiring system between all buildings.

Laboratory Investigations

Several laboratory investigations have been undertaken during the past two years. One of these, which is now under way, is an attempt to develop an economical, dry heat dairy utensil sterilizer. Another problem, which has received attention, is the use of the standard ¼ hp. motor as a portable unit for a variety of farm jobs. Several months work has also been done on the use of electric hotbeds.

The Project has enjoyed the cooperation of the staff of the University of Maryland in the economic phases of the farm operations and in much of the experimental work. Assistance has also been received from the U. S. Department of Agriculture, particularly the Bureau of Home Economics. The Maryland Extension Service through Mr. R. W. Carpenter, Agricultural Engineer, is taking advantage of the demonstrations in carrying out a rural electrification program for the State.

The Project office and laboratory are located on the campus of the University of Maryland at College Park. The University is eight miles north of Washington on U. S. Highway No. 1. It is about a fifty mile drive from Washington to the farms and return. Friday is the visiting day and arrangements for visiting the farms should be made at the Project office.

A Reason

Jones was at a dinner party. He was shy and nervous, and could never summon up courage to speak because of his inability to say anything neat. All the evening he had been trying to think of something nice to say to his hostess. At last he thought he saw his chance.

"What a small appetite you have, Mr. Jones," said his hostess, with a smile.

"To sit next to you," he replied, gallantly, "would cause any man to lose his appetite."

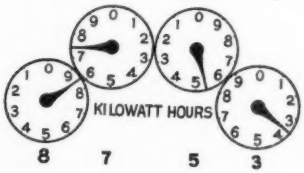
ELECTRICAL HOUSEKEEPING

Conducted by
GAIL MEREDITH

Measuring Electricity

THE grocer figures your bill from little slips that record your purchases on every trip to town. The butcher writes down the price of the meat you buy in a long brown book. But when you buy electricity, no clerk can set down the size of the lamp you are burning, nor how long a motor runs. Keeping those records is done by a mechanical device connected to the electric wiring on your farm. We call it a meter from the word "mete," to measure.

The electric meter is a speedometer for electric current rather than miles, only it is far more delicately made and far more accurate than the speedometer on your car. It keeps a continuous record, so you learn how much electricity you have used this month, by subtracting the reading of the meter on the first from the reading on the thirtieth. It works, you see, like the bushels register on a threshing machine, which records all the bushels the



machine has threshed since it was first put in use.

You can learn to read the meter just as easily as you learned to tell time from the face of a clock.

The ordinary meter has four dials. The pointer on the one at the right goes once around the dial when you use ten kilowatt hours of electric energy. The pointer on the second dial moves from zero to 1 in that same time. The pointer on the third dial will not move to 1 until the pointer has gone clear around the second dial once, and the first dial ten times.

The dial at the right, you see, shows the units of electricity that are used, the next the tens, the third, the hundreds, and the fourth, the thousands. So when you read the meter, you simply write down the figures in the same order that they appear on the dials. The figure to use is always the one the pointer has already passed. Be sure to notice that the hands on alternate dials move in opposite directions.

* * *

Remote Control

A FEW weeks ago I met a woman who has learned to keep house beautifully, whether she is at home or not. She says it is all a matter of using your head, and perhaps it is. It seems to be in her case—but it is "using her head," coupled with a shrewd investment in modern equipment and wise use of it.

An Interesting Visit

But I want to tell you about my visit with her. She lives in southern Michigan. I was in her neighborhood to attend a farm meeting and as we started out to the school house where the meeting was to be, my hostess said: "We are going to stop in for a neighbor of mine. I hope you do not mind."

Mrs. Barth was washing some dishes at the sink when we went in. She dried her hands and came forward cordially. "I'll be ready in a minute," she said after shaking hands. "My daughter tele-

phoned this morning that she was bringing four girls home for the week-end and I've been getting supper."

Mrs. Ralston turned to me.

"Nothing ever bothers her. Company coming and she's on the program this afternoon, but she looks as cool as a cucumber. Now I'd be running around fit to be tied if I had to rush home and get supper for extras after the meeting tonight."

I smiled at Mrs. Barth.

"You do look calm enough," I agreed. "What is your recipe?"

She took a slip of paper out of her apron pocket.

"This," she said, waving it at me, "and this and this," nodding toward her electric range and a big refrigerator humming away under its breath in one corner of the kitchen.

She looked down at the paper.

"Dish is already in the oven."

"Dish!" we both exclaimed, involuntarily. She laughed aloud at our puzzled expressions.

"Dish," she said, "is a family name for anything that gives you meat, potatoes and bread all under one cover. See?" She opened the oven door and showed us a large glass casserole full of a number of things.

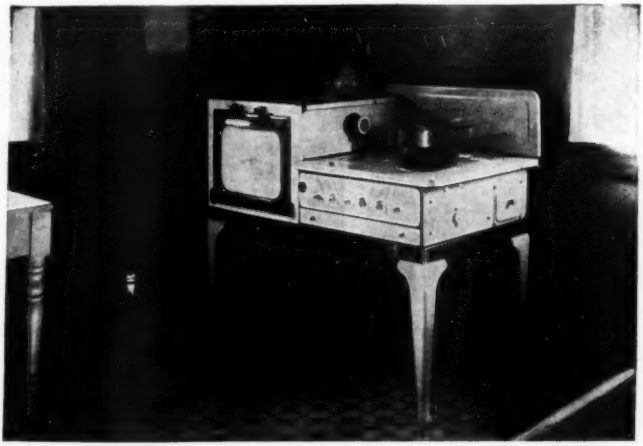
"What is in it?" asked Mrs. Ralston, shaking the dish a little.

A Company Meal

"Round steak run through the grinder, a couple of cans of spaghetti, and because this is a company meal, a can of mushrooms cut up fine. I brown the steak with a little onion, then I stir it into the spaghetti and cover it with the mushrooms poked in here and there. I've set my oven temperature control at 350° and I'm just going to set this clock to turn the electric current on in the oven at five o'clock and off at six."

The little timer was a new one and Mrs. Ralston and I examined it with interest. There were two dials. The pointer on one stood at five and the one on the other at six. Regulating it was as simple as setting an alarm clock. Mrs. Barth looked at it proudly.

"That makes cooking just as nearly automatic as anybody wants," she smiled. "Here I am putting my food in the oven and



The electric range, equipped with a timer, is one of Mrs. Barth's chief kitchen aids.

going off to a meeting ten miles away and I know that clock will turn the current on at just the time I want. I know that regulator here on the side of the oven will keep the current on just enough to keep the temperature up to 350°; it won't let it drop nor will it waste my current running the temperature higher than I need. If I get back before six, well and good. If I don't, the clock will turn the current off for me."

Then she picked up the slip of paper she had dropped to show us the clock.

"Everything is checked off and I can go. The dessert, apricot whip, is already in the sherbet glasses in the refrigerator. Apples are chipped and sprinkled with lemon juice to keep them from turning black. The cabbage and dates are cut up. I can mix them up into a salad and get it on the table while my rolls are baking." She waved a hand toward a pan of rolls covered with a cloth and set far enough away from the heat to rise slowly.

Mrs. Ralston followed her into the next room to get her coat.

"Even her table is ready," she called back to me.

"Yes, I guess everything's ready," said Mrs. Barth as she came back drawing on her gloves. "I've had a busy morning, but now I can forget all about it. Let's go."

I call this housekeeping by remote control.

• OUR NEIGHBORS •

A Banana Cake for Mr. Hoover

Dear Gail Meredith:

The other day I saw a picture of a mixer like the one you use for bread and cake and ice cream. It was in a daily paper. A little eleven-year-old boy was using it to make a cake for President Hoover. I thought you might be interested in it perhaps enough to call David, our neighbor's little boy, and put him in your *Neighbor's* column.

The boy's name is David Nutt. He is the son of J. R. Nutt of Cleveland, a personal friend of Mr. Hoover's. A few weeks ago Mr. and Mrs. Hoover came to Cleveland to a national meeting of some kind. There they were guests at the Nutt home. The morning of the day they were to come David decided to make them a cake.

It was not his first cake, by any means. He had been experimenting with that kitchen mixer ever since it first came into their kitchen, because he had always been interested in machinery and he had to find out for himself just how all the different gadgets worked.

Before long he actually began to make cakes himself, very successful cakes. They always turned out the same because he always followed the recipes with the exactness of an engineer.

This morning he went over his recipes very carefully and selected one for banana cake. Then he put on his white apron and chef's cap and spent the morning in the kitchen. Can't you just imagine him carefully measuring out the flour and shortening, pour-

Happy New Year to you all. This special message is for those who are sending us pleasant letters about interesting women. Far too few of you send pictures with your letters. We are all curious, you must remember, to know how folks look. For the most interesting letter and the best picture that we get this month, we will pay $5.00. The letters are to be in by February first.

FOUR bushels of food can be stored in the big porcelain-lined interior of the Kelvinator Yukon Model, the new low-priced *quality* electric refrigerator.

But size is only one of the many features. The Yukon has an all-steel cabinet; a Temperature Selector and Defrosting Switch; five different freezing speeds; and the large capacity of 42 ice cubes, or 4 pounds of ice per freezing. It is remarkably quiet; economical to operate; can be connected to any electric light socket; and can easily be moved from place to place.

See the Yukon at your local power company's salesroom or at the nearest Kelvinator dealers. It is the outstanding value in electric refrigeration today. Literature will be sent free upon request to—

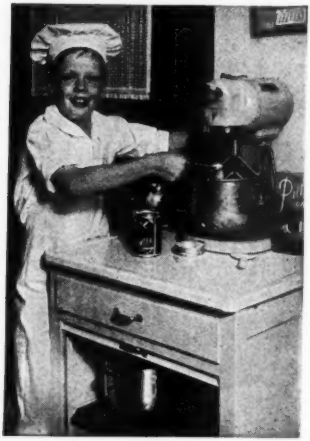
Kelvinator

Kelvinator Corporation, 14280 Plymouth Road, Detroit, Mich.
Kelvinator of Canada, Limited, London, Ontario
Kelvinator Limited, London, England

No Kelvinator Has Ever Worn Out

ing in the sugar and fussing over every single detail of that cake? I don't guess he left that kitchen a minute while the cake was in the oven, either.

When the President and his party got there, around four, David was



Aided by the electric mixer, this young lad is preparing a cake for the visit of President Hoover.

ready with his cake and they all had some for tea. David himself passed it, the paper said, and his mother cut big slices for each guest.

The President bit into his piece and smiled his nice slow smile of approval, then he said:

"David, if you ever want a job as a baker, come to the White House and I will make you a chef!"

Yours truly,

A. M. S.

Vacuum the Automobile

By Peggy Long

That old bugaboo of cleaning out the inside of the automobile after you've been on a dusty trip or when mud has been tracked into it, or when it simply hasn't been cleaned for a long time, will vanish if you will just put the vacuum cleaner to work.

No, you needn't bring the car into the house, nor carry the vacuum cleaner out to the barn or garage. Just drive the automobile up to the back door—or the front or the side or wherever the most convenient point of attaching your cleaner is—and open the doors. Then bring out an extension cord or two, string them on to the cleaner so that it will reach out to the car, and go to work.

In five or ten minutes it will all be done, the car as fresh inside as when it was new. And you won't be tired nor smeared nor choked with dust, either, as you were when you used the old "shaking and sweeping" methods.

One Million Electrified Farms Predicted

Electric service will be extended to a total of 1,000,000 farms in the United States within the next four years, it is declared by the Middle West Utilities Company in "Harvest and Highlines," a 112 page study of electric power in agriculture, which was published recently.

Rural electric lines 150,000 miles in length are now in service and the number of farm electric customers reached in the last eight years is almost as great as the number of all kinds of electric users, at the end of the first twenty-five years of the history of the electric light and power industry, the book states.

While American farms in the aggregate have the largest power equipment of any other industry, except the railroads, it is declared that electricity is the first effective application of power to the farmer's "chore" work, a comparatively neglected area of "farm problem" discussion which contains probabilities of marked improvement in agricultural prosperity. This kind of farm work, especially when concerned with livestock raising, offers the best present returns to the farm besides assuring future benefits through soil conservation, the study maintains.

"In providing the constant stream of pure water by automatic pumping, in feed grinding, in silage cutting, in hay hoisting, hay drying, and the preparation of poultry food, in hatching and brooding of chicks, the milking of cows, the refrigeration of milk, and in scores of other barnyard functions, electrical practice is now well established," the book states.

Turn a switch to hatch chicks!

Cleanest, safest, surest method known. No bother—no fire danger—no worry. No oil lamp to fill, trim or clean. No flame to adjust. No smoke, dirt or odor. Season after season also proves low operating cost of the

OAKES
ELECTRIC INCUBATOR

100% automatic. Hatches more and stronger chicks. All because electric heat is steady heat, sure heat. Every egg, every minute, gets proper heat, ventilation and moisture. Round design eliminates cold corners. Quickly convertible into brooder. Send for catalog.

Oakes Electric Heater with Fount
Sanitary—easy to clean. Automatic float valve regulates water. Griddle type Electric Heater keeps water warm. Write for catalog, prices, etc.

Healthier chicks!
No ashes, fumes, trouble

The Oakes Electric Brooder is 100% automatic. Maintains even heat always. No crowding or smothering. No lamp or stove to take up space. No fire hazard. No danger of gassing chicks. Saves work, worry, time. Five sizes, 100 to 1000 chicks. Write for catalog.

Below—Oakes Electric Heated Brooder

More Eggs!
When hens drink *warm* water!

Eggs are 65% water. Heat the water for your flocks. They'll drink 25% more, lay well, and keep in good health all winter. The Oakes Electric Heated Watering Trough and Oakes Electric Heated Fountain offer a safe, sure, economical way of providing warm water. No fire hazard. No dangerous gases. No lamps to trim, clean or fill. Write for catalog. (6)

Above—Oakes Never-Dry Electric Heated Drinking Trough

THE OAKES MFG. COMPANY
Dept. 77, Tipton, Ind.

For the Pig That Goes to Market—Early

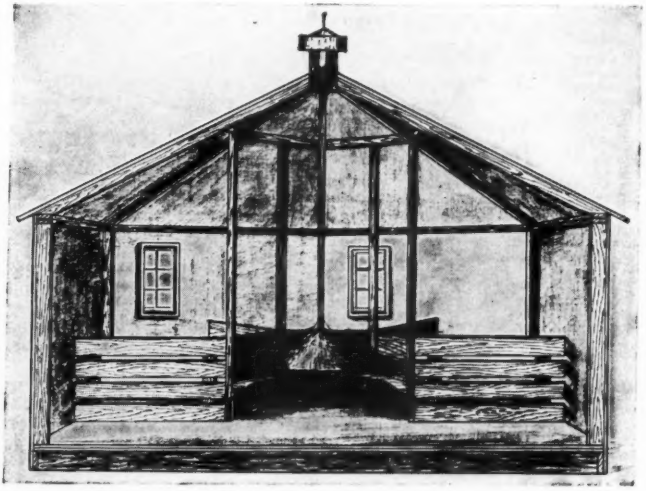
By J. M. Larson

ELECTRICITY is being used in heating pads for rheumatism, pneumonia, colds and other troubles a man might have. Baby gets the reflector heater's company when he gets his bath. Baby chicks have a nice warm brooder to hover them; but what about the little baby pig that is born and kept in the cold barn?

A good many farms that have electric service are now equipped with the common chick brooders. These brooders can serve two purposes with a little planning and work. Farrowing season in most parts of the country comes earlier than chick hatching and brooding, which makes it possible to use the same brooder for both purposes. The accompany illustration shows how one of these brooders can be installed. The first precaution is to see that the house in which it is to be used is fairly well insulated. A little money spent for insulating material will be saved many times over in reducing the amount of electrical energy used. It also reduces the variations in temperature from one part of the building to another and cuts out drafts. It is also well to provide an extra layer of tight flooring under the brooder. The center space should be constructed so that the sows cannot get at the brooder and disturb it. A temperature of about 65° F. should be maintained under the brooder. This is warm enough for the small pigs and it is not so high that the difference in temperature under the brooder and in the room is great enough so that the pigs will become chilled when they are out in the room.

Temperature Control

The thermostat on the brooder will maintain the desired temperature so that very little attention will be required for its operation. In case of real cold weather, the brooder can be covered with a blanket. Care must be taken to provide some kind of a vent and it must be kept open at all times.



A suggested method for installing an electric brooder to keep the baby pigs warm.

WATER SYSTEMS

Increase Farm Profits!

Sold on Easy Payments

A LITTLE Paul electric pump will deliver *more water for a cent than a man can pump and carry in an hour.* Plenty of fresh, clean, cool water for kitchen, dairy and barn! *What a relief from back-breaking labor!* Facts prove, too, that ample water supply greatly increases the profits from live stock.

If you do not have an efficient water system, you are not getting the most from farm electricity. Write today!

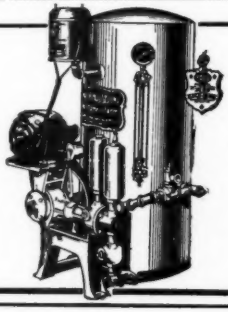
FORT WAYNE ENGINEERING & MFG. COMPANY
FORT WAYNE, INDIANA

Pumps & Water Systems, Softeners, Heaters

Fort Wayne Engineering & Mfg. Co.,
1722 N. Harrison St., Fort Wayne, Ind.
Send complete information and prices on Paul Water Systems and Payment Plan.

Name .....

Adress .....



5 Horse Power Century Portable Power Unit

Easily Portable

This Century Portable Power Unit can be easily moved from one job to another and quickly set up to give all the advantages of a permanent installation... Save time and labor by putting this unit to work for you anywhere . . . Motors can be regularly furnished in 3, 5 and 7½ horse power sizes, either single phase or polyphase, alternating current.

CENTURY ELECTRIC CO.
1806 Pine St. St. Louis, Mo.

40 U. S. and Canadian Stock Points and more than 75 Outside Thereof

Century MOTORS

The fire hazard is greatly reduced. The heating elements of the brooder are heated only to a black heat and for this reason there is no danger of fires from it. Electric brooders are not limited to the type of brooder house shown in the diagram accompanying this article. Any kind of a pig house can be supplied with an electric brooder as long as care is taken to put the brooder in a place where the sows will not disturb it and also permit convenient access to it for the small pigs.

New Arrangement for Machine Milking

By Geo. W. Kable

Something different in milking barns is being tried by the Detroit Creamery Farm. The Detroit Creamery Co. milks a large number of cows and produces a high quality of milk under very sanitary conditions.

The accompanying illustration shows the new arrangement of the milking barn. The cows are brought into the barn along an alleyway at either side of the milking room. A gate on the alley side of the milking stall is swung across the alley and the cow is guided into place. The cows stand with their sides toward the operating space, which is in the center of the barn. This operating space is about twelve inches below the stall levels, which eliminates much of the stooping in placing the milking machines. After the cow has been milked, another gate is swung out which permits her to step out into the alley and proceed through the barn while another cow is brought in to her place.

While this is an arrangement for the large commercial dairy, it may suggest possibilities for a more satisfactory arrangement for the small milking barn or the ordinary dairy barn where milking machines are used.

My Conscience and I

When I go away I take conscience along,
We journey the weary days through;
And when I'm in doubt if something is wrong,
It is consicence that whispers, "Be True."

Whenever I'm tempted or sore in dismay,
And wonder what course to pursue,
I go to my conscience and timidly say,
"I wait for instructions from you."

—Tessa Sweazy Webb.

Well. Ever stop to think that day breaks, but never falls, while night falls, but never breaks?

The milking room of the Detroit Creamery Farm into which cows are brought for milking. The milking units shown are in operation.

GET THE FACTS ON THIS

REMARKABLE BROODER

MAKOMB DELUXE ELECTRIC

Every flock owner with electric power should know about this brooder. It is perfected to a point where it leaves nothing to be desired in economy, convenience or efficiency. Learn how it *circulates* and *radiates* heat and reduces current costs. DeLuxe *Insulated* canopy with reflecting metal interior lowers current cost. Positive make-and-break switch—guaranteed element and snap-off Automatic Temperature Control. No pitting, arcing or radio interference. Get all of these surprising facts about this brooder by writing for the big new Makomb Catalog and Poultry Equipment Guide. It's a great book and absolutely free.

MAKOMB

Poultry Raising Equipment

GLOBE AMERICAN CORPORATION, KOKOMO, INDIANA

"World's Largest Manufacturer of Brooders"

Cullman *Pump Drive*

Just clamp the Cullman electric pump drive to the pump and connect the wires. Then push a button to pump water.

Operates in all kinds of weather. Safe—Dependable. Can be furnished with shaft for mounting power pulley.

Other Cullman units may be added later to form a complete pressure system.

WRITE

CULLMAN WHEEL CO.

1342 Altgeld St. Chicago, Ill.

A DIRECT GEARED ELECTRIC JACK

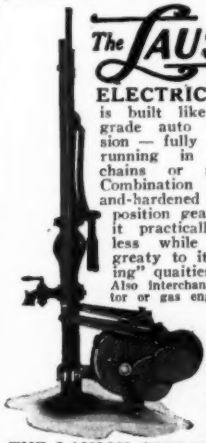
with a reputation for durability performance and maximum safety.

The LAUSON

ELECTRIC JACK

is built like a high grade auto transmission — fully enclosed, running in oil. No chains or sprockets. Combination of cut-and-hardened and composition gears makes it practically noiseless while adding greaty to its "wearing" quaities.

Also interchangeable motor or gas engine types.



Compete Water Systems

Write for Literature on Either or All.

THE LAUSON CORPORATION

700 Michigan St., New Holstein, Wis.

Questions and Answers

Conducted by
H. J. GALLAGHER
Agricultural Engineering Dept.
Michigan State College

Note—Readers are invited to send in questions which will be answered in the order received.

Question: *One reason I wired for electricity was to pump water, I supposed an electric motor would last a long time, I have had two in one month and they both played out and I am again using my gas engine on the pump jack. What I want to know is how big a motor I need. It is 12 feet from the well platform to the water, the water is pumped to a storage tank in the house and piped from the house to the stock tank. I was told a ¼ H.P. motor was large enough and I bought a new guaranteed motor for $9.00, it lasted two weeks, the company sent me a new motor and it lasted one week. Do larger motors wear out so quick too and will a ½ H.P. motor be big enough?*

Answer: I assume that your pump jack is used on an ordinary windmill type pump, if so with the installation you describe, a ¼ H.P. motor is large enough. A new ¼ H.P. motor that can be purchased for $9.00 would indicate that it was a split phase motor and a split phase motor is not designed for such jobs as pumping water. Other farmers have made this same mistake and become discouraged with electric operation, when it was no fault of the service. Split phase motors are not intended for use where a high starting torque is required.

Small motors, ¼ H.P. size or less, are made in two types—the split phase and repulsion induction. In the split phase motor there are generally two windings interposed on its stationary field. One winding, the main or running winding is connected to the line while the motor is operating; the other winding, the starting winding is connected to the line only long enough to start the motor and bring it up to induction speed, when it is automatically disconnected by a centrifugally operated cut-out switch. To start the motor the two windings take about seven times the normal rated current load. This heavy inrush of current combined with a very low overload starting capacity quickly burns out the windings unless the load starts easily and quickly. A pump jack neither starts easily nor gains normal speed quickly, consequently it is no job for a split phase motor. Other undesirable characteristics of split phase motors are that when connected to a circuit supplying lights, they cause a flickering or dimming of the lights during the starting period, and if the voltage drops as much as 10 per cent below normal they are likely to stall which again means burned windings.

The repulsion induction type motors have none of the disadvantages of the split phase type. They are a rugged motor designed for long time operation. These motors start as a straight repulsion type, the armature current being carried through a commutator and brushes. As the motor approaches its rated speed the commutator bars are all automatically short circuited and the motor then runs as a straight induction type motor. Motors of this type have a large overload capacity and will start and bring up to speed 100—200 per cent of their rated load on about twice the normal running current.

The starting torque is 300—400 per cent greater than the average

Alternating and Direct Current Motors

Truly an indispensable hired man is the Fractional Horse Power Motor—Use it on the pump, fanning mill, feed grinder, tool grinder, freezer, meat chopper, washer, and many other applications.
Cost is very nominal, operate economically, give long service.
Demand Marathon "OK" Motors upon appliances that you buy. They will insure you long and satisfactory service.

MARATHON Electric Mfg. Co.
Box 440,
WAUSAU, WISCONSIN

STEWART
STOCKMAN Electric Clipper
NOW-only $37.50

Highest Quality Lowest Price

Among its features are: Full ½ H.P. motor that will also run pump, churn, washing machine, etc. Equipped with latest model Stewart B-1 Clipping Head—the world's best. Does quicker, better job of clipping cows, horses, mules—and is easier to use.

Other Complete Electric Machines Low as $18.50

Get New Free Catalog

New catalog announces most sensational values in electric clippers ever known—in the complete Stewart line of clipping machines. We also adapt your hand clippers and shearing machines for use with motor for $5.50. Write for particulars.

Chicago Flexible Shaft Company
5524 Roosevelt Road : Chicago
World's Largest Makers of Clipping and Shearing Machines

You can rely on our advertisers.
If they can't supply your wants
see page 43.

The "Hired Hand" that never quits!

MASTER PORTABLE FARM MOTOR ····

The Master Electric Co.
DAYTON — OHIO

BURPEE'S SEEDS GROW

The Vegetables and Flowers you would like to see growing in your garden—read all about them in Burpee's

Annual Garden Book

It describes the Burpee Quality Seeds, Bulbs, and Plants. Burpee's Annual will be mailed to you free. Write for your copy today.

W. Atlee Burpee Co.
144 Burpee Bldg., Philadelphia

split phase motor and it will start the same load on about 20 per cent less voltage than the split phase type.

With a ¼ H.P. repulsion induction motor manufactured by a reputable company such as your power company would be glad to recommend, you can depend upon satisfactory pumping operation. Motors larger than ¼ H.P. are of the repulsion induction type.

Question: *How can an electric lamp bulb be used to keep water from freezing in the poultry house?*

Answer: A simple method is to take an empty coffee can, punch a hole in the cover for the extension cord, attach a lamp socket on the inside of the cover and use a 40—100 watt lamp, depending upon the amount of water. Fill the can half full of sand or gravel and put on the cover. This is done by inverting the can and putting on the cover at the same time to permit the lamp to get partially below the sand. The sand merely weighs the can down and keeps it in an upright position in the water pan. Heaters of this type have proven very satisfactory.

POPPING CORN ON THE ELECTRIC RANGE

By Katherine Goeppinger

Although you may not have an electric corn popper, you can still pop corn on your electric range without wasting a lot of precious heat!

Here is a utensil that fits the unit and instead of shuffling the pan back and forth over the heat, you simply turn an agitator which keeps the kernels in motion to insure thorough popping. The cover can be locked with a simple twist so that corn popper may be inverted to shake out the unpopped kernels.

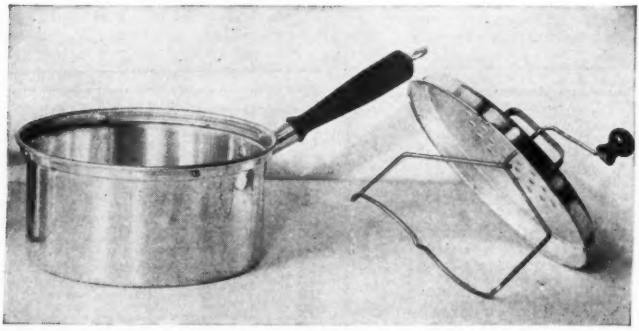
This utensil is of aluminum and may be had for a little over a dollar. The investment is a sensible one because the pan can be used for other purposes. It has a capacity of four quarts and without the cover, it may be used as a handy stew pan.

Great Scott!

The professor had just finished an evening talking on Sir Walter Scott and his works when a lady said, "Oh! Professor, I have so enjoyed your talk. Scott is a great favorite of mine."

"Indeed," said the professor, "what one of his books do you like best?"

"Oh," answered the lady, "I haven't read any of his books, but I am so fond of his Emulsion—I've used a lot of that."



A corn popper for use on the electric range—a two-in-one piece of equipment.

Front Cover Title Contest

First Prize for November—$25.00

"Supplied with pie and electric power,
Content to sit and feed by the hour,"

Mrs. Warren Miller,
R. 2, Hales Corners, Wis.

The following titles have been selected as winners of the $5 cash prizes:

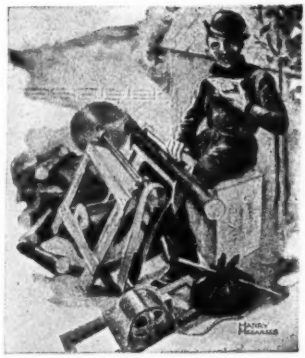
"Pie is easily earned when the saw is electrically turned," Mary F. Dickey, Box 165, Monticello, Ark.

"A 'handout' is quickly won, When the woodsaw's motor run," J. E. Barrick, 35 Hartman Bldg., York, Pa.

"Electrified buzz saws and juicy pies, Make for a hoboes paradise," Mrs. E. R. Scherbarth, R. 1, Oakwood, Wis.

"A motor, a bum and a piece of pie, A combination that makes the wood fly," E. J. Boddy, Vancouver, Mich.

"While the hobo eats the pie, The motor makes the wood-pile fly," Miss V. E. Hendrikson, R. 4, West Alexandria, Ohio.



Rules for January Contest

For the best title to this month's front cover illustration, a cash prize of $25.00 will be awarded.

In addition, we will pay $5.00 for each of five titles given honorable mention.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

The winners will be announced in the March issue.

Only the farmers or members of the farm family, to whom this magazine was sent, are eligible.

Only one title may be submitted.

Use the form below or write your answers on a plain sheet of paper in similar form.

Contestants must answer question (a).

Write plainly and send your suggestion to the Title Editor, ELECTRICITY ON THE FARM, 24 W. 40th St., New York, before February 1.

My title for January Front Cover picture is.....

.....

.....

.....

.....

(a) Have you a Sewage Disposal System? Yes ☐ No ☐

If you have, please check the type

1 Septic System with Metal tank ☐
2 Septic System with Concrete tank ☐
3 Waterless or Chemical Toilet ☐
4 Cesspool ☐

Name..... R. F. D.....

Post Office .....County.....State.....

Under The CHESTNUT TREE

No Shining Example

We have heard of the woman
who lived in a shoe
And had children so many she
knew not what to do.
Her troubles were grievous, but
pity those who
Carry nine or ten kids in a car
built for two!
—N. Y. State Lion.

Dentist—"Where is the aching tooth located?"

Girl (a theatre usher)—"Balcony, first row to the right."

"There's nothing like perseverance. It wins in the long run."

"Not always. How about a hen on a china egg?"

Just A Day

Lady: "How much are these chickens?"

Butcher: "A dollar and a half, ma'am."

Lady: "Did you raise them yourself?"

Butcher: "Yes, they were $1.25 yesterday."—Baptist Adult Leader.

A farmer once asked the editor of a country paper for advice as follows:

"I have a horse that at times appears normal, but at other times is lame to an alarming degree. What shall I do?"

The reply came, "The next time that your horse appears normal, sell him."

Business To The End

The widow was helping arrange matters for the funeral. "It was John's wish that six bankers act as pallbearers," she said.

"That is a rather unusual request," said the undertaker. "What do you suppose was his reason?"

"Well," replied the widow. "These bankers carried John practically all his life and he thought they might as well finish the job."

Holding Up Traffic

A little fellow left in charge of his tiny brother called out: "Mother, won't you please speak to baby? He's sitting on the flypaper, and there's a lot of flies waiting to get on."

Father: "Young man, I understand you have made advances to my daughter."

Young man: "Yes, sir; I wasn't going to say any thing about it, but now since you've mentioned it, I wish you could get her to pay me back."

Real Diplomacy

Wife (on telephone, disguising her voice): "Guess who this is?"

Husband: It's—um—Edna."

Wife (furiously): "Edna! ! !"

Husband (disguising voice): "Guess who this is!"

Yes, and we can remember back in the old days that when a man reached back under his coat-tail, it was a threat. Now it's a promise.

"Does your husband remember your wedding anniversary, Mrs. Jones?"

"No, he doesn't, so I remind him of it in January and again in June and get two presents a year."

A Misunderstanding

When the preacher called for women to stand up and promise to go home and mother their husbands, only one little woman arose and when he told her to go home at once and mother her husband she said: "Mother him? I thought you said smother him!"

He: "This dining-room table goes back to Louis Fourteenth."

She: "That's nothing, my whole sitting-room suite goes back to Pears-Boeruck on the fifteenth."

Caller—"I didn't know your son was at college. Is this his freshman year?"

Mrs. Bunderby—"Oh, no indeed! He's a sycamore."

At College

The young man had just driven home from college at the close of the term.

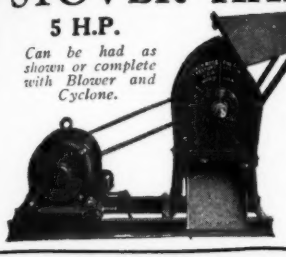
"Did you pass everything?" asked his mother, anxiously.

"Everything but two Studebakers and a Pierce-Arrow. Darned if they mustn't have had airplane motors in them!"

STOVER HAMMER MILLS

5 H.P.

Can be had as shown or complete with Blower and Cyclone.



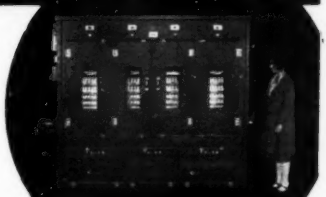
Bring Farm Relief

Ground feed makes healthier, better stock—cuts feeding costs 20%. This Stover mill, designed for high-line use, grinds all small grains, shelled and ear corn. Consult your power company. Write us for descriptive literature and name of nearest dealer.

STOVER MFG. & ENG. CO.
Electric Driven Farm Machinery
65 Lake Street Freeport, Illinois

MAKE REAL PROFITS!

PETERSIME Electric Incubators are making larger profits for Hatcherymen and Poultrymen everywhere. Unmatched results—Lowest operation costs—built in five sizes from 1,400 to 15,984 capacity. Write for NEW Catalog—FREE—No obligation.



Ira M. Petersime & Son
EF-31, Gettysburg, Ohio

The

Inside Back Cover

is for your convenience.

Why not use it?

BUY DURO NOW

And settle the water supply problem forever—only a few dollars down payment brings fresh running water under strong pressure, piped into your house. Makes possible water in the kitchen, bath, inside sanitary toilet, laundry, water for sprinkling, lawn and garden, live stock and chickens. Write for illustrated electric water system catalog.

THE DURO COMPANY
537 E. Monument Ave., Dayton, Ohio

DURO
Automatic Water Systems

Send for this Book

ATKINS SAW BOOK
for Home Craftsmen

Farm Carpentry is EASY

...when you know the best way to cut and fit 24 types of joints, shown in this book. Diagrams, photos and clear instructions will soon teach you to do carpentry like an expert. Tells how to plan a workshop...gives lists of tools...suggests suitable bench machines ...and shows how to build a work-bench, saw-horses, tool box and wall cabinet.

Also, tells where to obtain job plans to build 200 things for home, farm, garden, sports, etc. 32-page book costs a dime; worth dollars to every tool user. Just send 10c to **E. C. ATKINS and Company, 415 S. Illinois St., Indianapolis, Indiana.** ("The Silver Steel Saw People.")

Saves Us Time

My electrical milking machine is a splendid servant. My husband and I work our one hundred acre farm alone and our milker saves us one hour in the morning and one hour in the evening, in which time we can do other work. It also saves us a lot of hard labor, especially at haying and harvest time. We are tired from working in the sun all day, and are glad to let the electricity milk our cows.

MRS. WALTER EHNRT,
R. F. D. 1, Box 100,
Brookfield, Mass.

• • •

From a Title Winner

I received check for title prize, and thank you; for the same, and also for your nice letter of congratulation. You ask me, what most interests me in your little magazine, I am of course vastly interested in the title page. But mostly in the delectable articles by the men and women who have made a special study of better and more profitable ways (while making life a greater pleasure) to do the work on the farm. I like too: the letters from farm wives giving their experience with poultry raising; and the different uses they make with electricity on the farm.

MRS. W. R. SMITH,
Arkansas City, Kansas.

• • •

Portable Electric Washer

We have two splendid healthy babies at our farm. Babies mean washing every day, and that means tedious, time-exhausting work to the busy farm housewife.

I have a portable electric washer which can be set on the kitchen table. It washes little fine things as nice as by hand and whirls them dry, ready for the line. So much time saved; so much handling over the numerous little pieces avoided! I do the washing while preparing dinner. Above all, the babies are kept sweet and clean. This is why my little washer means so much to me.

MRS. LEWIS H. STRATTON,
R. 4, Llenroc Farm,
Oxford, N. Y.

Singing Its Praises

Our electric refrigerator. It's been with us a year and we are not yet tired of singing its praises. Space does not permit of all the reasons as to why it is a favorite with us, I recommend to try one once, it will speak for itself, and this is not sales talk.

It's there all the time, costing practically nothing at all in cold weather if you live in the North, costing less than ice bought if you live where ice is needed all the year round.

It's clean, healthy and a pleasure to use—a friend.

MRS. E. L. BIRRELL,
521 Decatur Stree,
New Orleans, La.

• • •

Our Water System

I do not hesitate to say that our pure water system is our greatest electrical servant. It has one motor, which is sufficient to operate two pressure tanks and a fresh water valve that enables us to get our drinking water direct from the well. Economically it is a find, consuming only the electricity of a 40-watt bulb.

It brings fresh water to our stock, in the barn and pasture, and cools our milk (grade B) without ice. It brings hard and soft water to the kitchen and laundry and bath. It furnishes enough pressure for a shower. It has brought urban sanitation where it is most needed and appreciated.

MRS. CHAS. AUBERTINE,
Box 2, Rosiere, N. Y.

CLASSIFIED ADVERTISING

The LYON ELECTRIC COMPANY manufacture electric poultry equipment exclusively. Long, practical experience in the highly developed California rural electric field enables us to furnish quality devices at reasonable prices. The LYON line includes:. Brooders—Incubators — Egg Testers — Burglar. Temperature and Power-off Alarms — Heating Elements—Thermostatic Supplies—Time Switches—Wiring Supplies. Write for catalog today. LYON ELECTRIC COMPANY, 2075 Moore Street, San Diego, California.

MERCHANDISING SUPPLEMENT
Electricity on the Farm

Vol. 4 JANUARY, 1931 No. 1

RURAL LINE GROWTH

Figures recently prepared by the statistical department of the National Electric Light Association show 627,105 farms with high line electric service as of June 30th 1930, compared with 166,159 farms having such service on January 1st, 1924. In other words, over a period of five and one half years 460,946 farms have been connected up. This is an average rate of approximately 84,000 farms per year.

But authentic figures show that during the current year over 100,000 farms were reached by rural lines, which indicates that the rate of electrification of farms is speeding up. Even if there is no further acceleration, one million farms will have been electrified early in 1934.

A most interesting angle to the rural electrification movement is that the demand for such service keeps well ahead of the supply. There are far more farmers anxious to receive electric service than can be handled in the immediate future. Despite the unique situation in connection with farm service, requiring a very large percentage of farmers along a particular route to sign up before the service line can be extended, farm electrification is going ahead at a very rapid pace.

The Forward March of RURAL ELECTRICATION

Modern Machinery and Practices Advantages to Good Farmer; What Electricity Means to a Farm Family

By H. J. GALLAGHER

TWO national reports recently issued have decided significance on the future development program of farm electrification. The 1930 census report shows a large decrease in the number of farmers of the United States during the past ten years. The 1930 report of the National Electric Light Association shows a tremendous gain in farmers receiving central station service during the past four years.

What Analysis Reveals

An analysis of these two reports reveal that the farms being abandoned are in the poorer agricultural areas; this reduces the number of farm lines that would be built in communities that could not support them. The large increase in farm lines has been in the better agricultural sections that possess greater stability.

The decrease in farms does not necessarily mean a decrease in the number of acres farmed and it surely has not resulted in decreasing the agricultural commodities produced. Modern machinery and modern farming practices combine to increase production at lower operating costs, ultimately resulting in increased consumption. These factors are to the advantage of the good farmer—the one we want to see stay in the game.

Increases Efficiency

Electricity is playing its part in encouraging the better farmers to stay on the farm. It is a cheap and flexible source of power that increases the efficiency of farm operations and adds that degree of home comfort and convenience that is essential to a contented existence.

The full effect of what electricity will mean to agriculture is a matter of conjecture. The total percentage of farms having service is still relatively small and the amount of electric energy used by farmers is little compared to what it should be and will be in the future, as evidenced by the progress made during the past few years.

The N. E. L. A. report of January 1, 1927, credited Michigan with 6,800 farms receiving high line service. The average energy consumption per customer month was 30 KWH. In less than four years 20,200 Michigan farms have been supplied service and the average energy consumption per customer month of 27,000 farmers for September, 1930 was 70 KWH. One company supplying more than one third of the 27,000 customers had the high monthly average of 89½ KWH. This progress is indicative of the future.

Effects of Electricity

My personal curiosity is insatiable in getting behind the scenes and viewing all of the effects of electricity on the farm. To secure this information I have asked a number of farmers what electric service meant to them, but it is difficult for a farmer to put his version of electricity into words. The engineer is almost as bad, his jargon consists of time and labor and efficiency and money, all facts, but they have a rather harsh sound. The personal

equation is always the most interesting and I believe I came closer to receiving a better insight on the subject after, an afternoon's visit with a farm woman who was a bit of a philosopher.

The Wife's Viewpoint

Their farm had been wired eight months. With the advent of electricity came lights, the water system, bath, toilet, washing machine, iron, electric range, vacuum sweeper, feed grinder, and motor for the milking machine. This woman was the mother of four children, ranging from four to fifteen years of age; both she and her husband had always lived on the farm. I began the conversation with the inevitable question, "What do you think of electricity?" And her answer was "Electricity is the agency that released the bondage of farm women."

Smiles and Good Will

I knowingly glanced around at the labor saving equipment and she said, "No, you do not understand exactly what I mean, all of that equipment is wonderful, but to me they are the means to something better. Electricity has brought to me a peace—a tranquillity of mind that I have never known before. It gives me an opportunity to do some of the things I have always wanted to do, for instance, to rest a while this afternoon. Electricity has brought more smiles and good will to our home than we've had since the first year we were married. I notice a big change in my husband. We used to have a gas engine on our milking machine and mornings when it started hard or wouldn't start, he came to breakfast in an irritable frame of mind that meant sharp answers to the children or to me and one sharp answer begets another, so many a day was started wrong because of frayed nerves. Then drawing water at the pump and doing the housework all by hand in the old way, not only took up every minute of the day but always left some work undone. In the evening with the children home from school, the accumulation of the day's annoyances left both my husband and myself in anything but the proper frame of mind to enjoy their company or each other. To read we had to huddle together to share the light, and to a weary body and a weary mind too close an association even with your own family is sometimes jarring and the end of the day brought only thoughts of the same old tomorrow. Electricity has changed that, it has energized this family as it has that electric range. Look at the floor lamps in this room; we can now spend an evening without treading on each other's toes, we can even have the privacy of a well lighted room when we desire. It is an inducement to read and we have more time to read. I think differently because I have more things to think about. Instead of looking forward to another day of being chained to household work I know that tomorrow I can do my work easily and quickly and have time to read a story I started today or to visit my neighbors, to listen to the radio, take a nap or anything I choose, more hours of leisure in a month than I remember of having in a year. When the children come home from school, I am a better mother, when my husband finishes his day's work, I am a more cheerful wife. Electricity has brought happiness, and happiness is life.

The Farmer's Idea

"I know my husband doesn't think of these things in the same way I do, he thinks of electricity as a cheap power, as something that makes work easier, but it has always been different with men. Their work is outside in the fresh air and sunshine, they come in daily contact with other people, a little gossip over the line fence with a neighbor, a discussion with the county agricultural agent, or an argument with an electric salesman, there are plenty of them these days. Then too the nature of man's work changes with

(*Continued on page S6*)

Merchandising Water Systems in Volume

BY C. H. MORAN

Small Electric Plant Section, Westinghouse Elect. & Mfg. Co.

THE Westinghouse Electric and Manufacturing Company recently inaugurated an aggressive and definite advertising and selling program to increase the volume of water system sales.

It is a campaign that, for its scope and thoroughness in detail, deserves the attention of every person interested in sales volume and particularly those engaged in the sale of water systems. There are several outstanding considerations in such a campaign, and the following discussion indicates how they are treated in the portfolio for the new Westinghouse campaign.

The Market and Its Possibilities

In the beginning of a sales campaign, an analyzation of the market is necessary. The continual growth of the water system market indicates that this product is becoming a necessity to those who are located beyond the reach of the city water mains. In this survey the many places where water systems can be sold are indicated. Farms, nurseries, creameries, general stores, fish hatcheries, conservatories, green houses, country clubs, cemeteries are among the vast number of places where sales efforts may be directed. Hard water sections afford many possibilities. Rain water pumped from cisterns overcomes the inconvenience experienced where hard water is the normal supply. Homes, beauty parlors, barber shops, and laundries are prospective purchasers in hard water sections. Industrial plants have a menace to their boilers and pipes in corrosion caused by hard water. Soft water overcomes this. Incidentally, such industrial companies are prospects. Water systems are needed in cities and towns where the water pressure is not sufficient to supply upper floors and tall buildings and places at elevation with adequate pressure for fire protection, filling of bathtubs, shower baths, sprinkling of lawn and gardens, and washing of automobiles. This survey plainly shows the many places where water systems can be sold and is a careful guide for a systematic direction of direct mail and personal selling efforts.

A thorough knowledge of the product is necessary to the salesman. The outstanding features of both shallow and deep well water systems should be acquired. This is of major importance and aids the salesman in strengthening his sales talk.

The matter of application should be gone into very thoroughly. Charts and data concisely worked out should be available for salesman's assistance. They should be so complete that even a man who is unfamiliar with the problem of water system application can take these charts and data and select a system with the proper capacity for the job he is selling.

National Advertising Campaign

The make of water system sold should have national prominence. This is secured by a national advertising campaign. The manufacturer should have his products advertised in papers of national prominence. This background is necessary for a local campaign and is absolutely essential to the sale of water systems in volume.

Direct mail is a most important

sales assistance. It should be sent over carefully selected mailing lists. The mailing list then should constitute the actual calling list for the personal selling. Such direct mail should consist of at least three letters with return postcards. The purpose of the return postcards is to pull inquiries. These should lead to many immediate sales. Several mailing pieces should be available for enclosures with monthly statements and any general correspondence.

Local Newspaper Advertising

A special price offer for a limited time should be established. Low initial investment with easy monthly payments should be featured. This special offer with the easy payment plan as an added inducement should be mentioned in the direct mail. Then to tie in with the direct mail a local newspaper campaign should be conducted. Cuts and advertisements should be obtained from the manufacturer.

Storeroom Posters

Giant posters and signs should hang in the salesroom. They will attract the attention of visitors to the store. Posters and signs should appear on trucks and cars of the dealer. The manufacturer should provide these posters and signs.

A unique window display should be provided. This should cause people to flock to the store. It will arouse interest in the community. It will get publicity in the news items of the local papers.

A floor demonstrator is an in-

Attractive literature is a decided sales aid. Above is shown some of the material prepared by the Westinghouse Company on their electric water systems

dispensable sales aid. It enables the inside selling people to demonstrate the many advantages of the water system.

Portable Demonstrator

A portable demonstrator should be carried on a truck by the salesmen on their personal calls. With it, the salesman can prove to the prospect right on his own property—right at his own well—how easy it is to get water at the turn of a faucet. Experience proves that with such a demonstrator a large percentage of sales can be made on the first call.

Salesmen should be provided with selling reinforcements. They should be provided with a manual that will enable them to build up a compelling and convincing sales talk. This manual should acquaint them with the every-day objections that they will be confronted with by people who think they have a good reason for not buying. This manual should give information that will enable them to advance counter-arguments to successfully overcome these objections.

Meetings for salesmen should be scheduled. These meetings should be well planned and well outlined. They will accomplish two things which are essential to the success of the campaign. They will give the salesmen the information they need to successfully sell water systems. Next, they will familiarize them with the market analysis and general sales plan. These meetings should cover the market, apparatus, applications, installations, prices, time payments and general selling information, including competitive data.

Sales Contests

Last, but not least, to get real enthusiasm in the drive, a sales contest should be conducted with the various salesmen competing for prizes. Prizes may be either cash or merchandise. Keep sales tuned up with pep bulletins on special letterheads. Mail a bulletin to every salesman once each week. Announce the standings. Crowd them full of selling arguments, outstanding records of salesmanship and personal news of the progress being made.

In conclusion, the sale of water systems is profitable. The profit which can be obtained is directly in proportion with the efforts exerted. A well worked out campaign with all details, as just outlined, will prove that water systems can be sold in volume and that large profits are bound to result.

Forward March

(*Continued from page S3*)

the seasons, but a woman's work is very confining and offers little variation. Heretofore the most of the labor saving equipment purchased was for the farm work. I know they were necessary, but you can't use a tractor, a binder or a plow in the house—so they didn't help us much, but as you know—electricity is different, it works anywhere, it has given us farm women a new lease on life."

If this farm woman's version of electricity is true, and I sincerely believe it is, it means that in 27,-000 Michigan homes and in 600,-105 other farm homes of the United States the same subtle forces are at work in "releasing the bondage of farm women."

Farm Equipment Week

The National Association of Farm Equipment Manufacturers are again sponsoring Farm Equipment Week, to be observed February 16-21, 1931.

Every thoughtful farmer appreciates full well that in times of low prices, especially, it is the man with adequate equipment who stands the best show of making a fair operating profit. The wide-spread recognition of this fact is perhaps one reason why some of the great farm organizations have included among their more important projects the subject of lowering production costs, appreciating that one effective method of achieving this end is through the use of modern machinery.

Isn't It the Truth?

When a bird finds a parking place, it sings. When a man finds a parking place, he keeps on swearing.

RURAL ELECTRIFICATION Salesmen's Forum

Use of Electric Brooders Increasing

THE practicability of the electric brooder is becoming recognized rapidly by the farmer as shown by the number of them which are being purchased in various sections of the United States. Reports received by the writer indicate that at least 250 electric brooders were purchased by Indiana farmers during the 1930 brooding season. Figures reported (Electricity on the Farm, December, 1930) by Professor L. J. Smith, head of the Department of Agricultural Engineering of the State College of Washington showed that 433 electric brooders were sold in the state of Washington during the year 1929, besides 221 electric battery brooding units.

Brooders Gain Rapidly in Indiana

In Indiana the number of brooders purchased very probably represents an increase of 100 per cent in the use of electric brooders in the State. The reasons for this rather sudden adoption of electric brooders by Indiana farmers are several in number. The first one is probably due to the fact that many farms received electric service during 1929 for the first time. A large percentage of these new customers had rates available which after the use of a certain block of energy, provided current at a cost of three cents per kilowatt-hour. At this rate, the cost of fuel for heating brooders may be less for electric energy than for other types in Indiana particularly in late March, April, May, and June.

A second reason for this increased use of electric brooders is that farmers are learning more about the labor-saving possibilities of electric heat. The electric brooder provides one more way to use electric energy for heating purposes on the farm with satisfactory results alike to the producer as well as the user of it. The elimination of carrying fuel, stoking fires, and emptying ashes saves time for many a farmer's wife who takes care of the poultry in addition to her other duties. Fire hazard is minimized through the use of brooders of proper construction and this appeals to the farmer also.

Service Men Active

A third reason for this increase may be attributed to the efforts of rural service men of public utility companies to increase the use of electric brooders and the activities of dealers in poultry equipment. A hatchery concern located in one of the important poultry producing sections of the State sold 84 electric brooders during the 1930 season and has ordered 100 for the 1931 season from the manufacturer.

Electric brooders, however, are still considered by many to be in the experimental stage even though there are poultry raisers who have used them and secured excellent results. These users are convinced that for their farms the electric brooder is not experimental but a very practical and useful piece of equipment. Their belief is justified as shown by 21 complete reports of brooding results in 1930 from that number of Indiana farms and by six similar reports for the 1929 season made to the Agricultural Engineering Department of the Agricultural Experiment Station at Purdue University.

The future increase in use of

electric brooders including that for replacing or supplementing other brooding devices will depend on the degree of satisfaction rendered the user and the financial return he receives from such equipment. At the present time an answer to the satisfactoriness and the operating cost of the electric brooder as compared to that of others which have been used for many years can best be obtained from farm flock owners and from those Agricultural Experiment Stations which have conducted tests and experiments to secure such information.

Comparison of Results

Definitely outlined studies on the electric brooder have been carried on at the Agricultural Experiment Stations in the States of California, Oregon, Washington, and Indiana. The results obtained at these institutions are in close agreement on the following points:

The same rate and total mortality of chicks to 8 or 12 weeks of age may be expected from electric as for other types of brooders.

The same rate of growth and feed consumption for chicks 8 to 12 weeks of age for electric as for other types of brooders.

Less labor required in the care of the brooder and less danger from fire for electric than for other types of brooders.

Greater adaptability in meeting outside temperature conditions and greater economy of fuel by the electric brooder during variable weather conditions when compared with hard coal or oil burners.

The initial cost of electric brooding equipment is about the same as for other types.

Data and opinions vary widely on certain points which follow:

The costs and amounts of fuel for operating various types of brooders.

The most desirable temperature for the room in which the brooder is operated, whether electric or of another type.

The relative humidity in the brooder house that is most favorable for satisfactory brooding results with any type of brooder.

The amount of labor required for the care of electric brooders as compared with that for the hard coal, oil, or gas-heated brooders. The convenience and cleanliness of electric energy is readily admitted as an advantage over other fuels.

The effect on the chicks with an electric brooder of breaks in power service.

Each of the problems mentioned is important and there is a need for more facts relating to each one before any close agreement can be reached between the widely scattered users of various electrical brooding equipment.

The cost for fuel is a very important one and available data show from one-half to more than twice the cost for electricity as that for hard coal. The chief factors entering into this range are the cost per kilowatt-hour, the outdoor temperature during the brooding period, the type and construction of the brooder house, the number of chicks brooded under each hover, the total mortality during the brooding period which determines the number of chicks left to be charged with the total cost of fuel, and the judgment of the caretaker in adjusting the thermostat for temperature control to meet changing weather conditions and the reduced heat requirement of the chick as it grows older.

Desired Temperature

The desired temperature and relative humidity for the brooder house can not be answered with definite figures. The temperature recommended by the chick brooding specialist of Purdue University for the hover under which the chicks stay is from 90 to 100 degrees Fahrenheit during the first week with a gradual reduction in succeeding weeks as the chicks develop and show less need for this high temperature. The recommendation made with regard to house temperature is one that is comfortable for feeding

by the chicks and does not increase mortality or reduce gains in weight by them. The same recommendation made for the temperature of the house applies to the problem of humidity or moisture present in the house. When outdoor temperatures are below freezing and the houses are kept closed to conserve the heat which escapes from the brooder into the colony brooder house, the walls, floor, and litter in the house may become very wet in a short time and may even require more frequent removal and replacement of the litter if the floor is to be kept dry like the floor in the house with a hard coal brooder stove. This particular problem is one which applies to early brooding with electric brooders in colony brooder houses without artificial heat under Indiana conditions but does not apply to either temperature or moisture after the middle to the last of March under those conditions.

An Important Factor

The regularity and dependability of the power supply is a very important factor in helping the farmer decide to buy an electric brooder. In locations where power companies experience difficulty in maintaining 24 hour service because of plant or line conditions, it would seem advisable for that company to correct those sources of trouble before venturing into active promotion of the use of electric brooders. In many localities service is available which experiences very few breaks or interruptions because of tie-ins with several sources of supply. The length of time which current may be off and not injure the chicks depends upon so many variable factors such as age of chicks, temperature of houses, type of brooder, etc., that it is practically impossible to give an exact time.

Temperature Alarm Feature Desirable

Provision by the power company, or dealer if the brooder is sold by him, of a no-voltage or temperature alarm preferably the latter should be made for every electric brooder sold. The temperature alarm which gives notice of too high as well as too low temperatures is best suited for this purpose.

The results from 21 Indiana farm flocks using electric brooders in 1930 should give as satisfactory an answer to the problem already discussed as any information available at this time since the figures show exactly what has happened on 21 different farms.

The cost of fuel for brooding with electric energy at 3 cents per kilowatt-hour for nearly all of these farms would have been less than that of hard coal if it had been used at a cost of $15 to $16 per ton with a requirement of

Summary of 21 Electric Brooders in Indiana, 1930

Total chicks started		7,175
Chicks in each brooder (range)		150-520
Size of hover (range inches diameter)		42-72
Wattage of heating element (range)		440-660
Dates of starting brooders		Mar. 18 to May 13
Brooding period (range days)		34-56
Mortality in flocks (range)		1.25-55.4%
Flocks with less than 10% loss	9	
Flocks with 10-20% loss	5	
Flocks with 20-30% loss	3	
Flocks with over 30% loss	4	
Fuel for brooding kw.-hr. (flock range)		52-192
Fuel per chick kw.-hr. (all flocks range)		.125-3.82
Fuel per chick kw.-hr. (4 flocks)		.125-.250
Flocks per chick kw.-hr. (11 flocks)		.250-.500
Fuel per chick kw.-hr. (4 flocks)		.500-.875
Fuel per chick kw.-hr. (2 flocks)		over .875

800 to 1200 pounds of coal for each brooder.

The mortality ranging from 1.25 per cent to 55.4 per cent is a usual occurrence when the results from many farms are compared and can not in any way be attributed to the type of brooder. The range in number of chicks started under these brooders is also typical of what occurs on different farms regardless of the type of brooder used.

Test Results Compared

On one of these farms records were secured of a hard coal and an oil-heated brooder as well as the electric. All of these brooders were started on April 2 and operated until May 14, a total period of 42 days. Under the coal and electric brooders 360 chicks were placed and 310 under the oil-heated brooder. The mortality was practically the same under each of the brooders, 37 for the electric, 35 for the coal, and 28 for the oil. Fuel used was 104.5 kilowatt hours for the electric, 842 pounds hard coal for the coal, and 37 gallons of kerosene for the oil. Costs of fuel with electric current at 3 cents per kilowatt hour, hard coal at $16 per ton, and kerosene at 14 cents per gallon were $3.14 for the electric, $6.74 for the coal, and $5.32 for the oil-heated brooder.

Size of Element Required

Apparently, the success of electric brooders in growing as many chicks and at as low a fuel cost as can be done with hard coal burning brooders is being demonstrated on many Indiana farms at the present time. Much of this success may be due to the fact that manufacturers of electric brooders have been willing to equip their brooders with larger capacity heating elements and dependable thermostats which the old type electric brooder did not carry. Experimental work at Purdue University in 1928 indicated a need of a 500-watt heating element as a minimum size for a 52-inch square brooder, if early brooding was to be practiced.

The well-constructed electric brooder, equipped with a heating element carrying 500 or more watts, a reliable thermostat and fed by a dependable power line has demonstrated to many users its satisfaction and profitableness in brooding chicks.

The possibility of developing this desirable electric load for the power company is shown by the results secured in Indiana in 1930 when power companies became interested. The possibility for the dealer in poultry equipment or hatchery to secure sales of equipment is shown in the case mentioned.

Available Literature

For those readers who may be interested in learning more of the experiments conducted on the use of electric brooders, the following are suggested: "The Electric Brooder," University of California Agricultural Experiment Station Bulletin 441, Davis, California, "Electric Brooders" Agricultural Experiment Station Oregon State Agricultural College, Bulletin 262, Corvallis, Oregon, and "Electric Incubation and Brooding" State College of Washington, Pullman, Washington, Bulletin 231. Copies of these publications are usually furnished in limited quantities free of charge. A bulletin will also be available from the Purdue University, Agricultural Experiment Station, Lafayette, Indiana, after February 1, 1931, on the results of four year's tests of electric brooders. For the information of those who may be interested in manufacturers of electric brooders, the following list is included:

Buckeye Incubator Company, Springfield, Ohio.

Globe American Corporation, Kokomo, Indiana.

Lyon Electric Company, San Diego, California.

Mailwin Manufacturing Co., Seattle, Washington.

Oakes Manufacturing Co., Tipton, Indiana.

St. Helens Incubator Co., Centralia, Washington.

Wellington J. Smith Co., Davis-Farley Bldg., Cleveland, Ohio.

BOB'S PAGE

Devoted to Merchandising of Electrical Equipment in Rural Communities

Conducted by Robt. J. Fulton

Advantages of a Water System

ONE of the first essentials of life is *water.* In early times man followed the streams and other bodies of water. Afterwards he learned how to drive a pipe into the ground and to raise water to the surface. This made it possible to have settlements where no streams travelled. But this task of raising of water by hand was hard work and never relished by man or woman. It was only with the development of the water system, that the family living apart from city advantages was able to enjoy the comforts of the most important asset in the home—fresh running water without the effort of hand pumping and carrying.

Benefits Appreciated

Today you do not have to sell a consumer on the advantages of a water system. He realizes it would save his wife from the drudgery of pumping and carrying water, and an immense amount of time and other labor which is required when the pump is located out in the yard. Also he realizes the advantages of clean barns, fresh drinking water for the stock and the saving of hours of hard work in pumping water by hand for the stock. Also for sprinkling the garden, lawn, etc., and last but not least, the increased value of the home or farm which has a modern water system.

Hundreds of gallons of water are required daily, and every gallon must be pumped, carried and dumped. Then when the day's work is done the farmer is tired, hot and dusty, but wanting a bath, must still do more pumping before the water can be heated on the kitchen stove and carried to a tub.

Then there is the ever present menace of fire. What would the chances be of preventing a severe fire loss if water had to be pumped and carried to extinguish the blaze? Yet an ordinary garden hose carrying water under pressure could check the fire at its start in the space of a few minutes.

Health and Sanitation

Also consider the health and sanitation standpoint too. Running water coming from its source in safe clean pipes is not exposed to a dust and germ laden atmosphere. There is no lugging, and no trips to an outside pump in rainy or bitter cold weather. Livestock barns can be flushed out with a hose and milking equipment can be sterilized in hot flowing water.

The consumer today simply needs to be shown that he can afford to own a water system because he already knows the advantages of water under pressure 24 hours a day. You can convince him just how little a water system will really cost. $65 and up for shallow wells and $104 and up for deep wells, all depending on capacity, etc., will install this labor saving convenience in the farm home. Explain to the farmer how short a time it would take to make up this difference, how the cost of a water system would be overcome by greater sanitation in his home and farm buildings, increased health of his family, increased production from his dairy herd and poultry flocks, savings in case of fire, increased value of his property and in greater happiness and sanitation of the whole family.

With all of these advantages,

Approximate Quantities of Water Required for Various Purposes

Each member of the family for all purposes including kitchen, bath, laundry, etc.	25	Gal. Daily
To fill ordinary lavatory	1½	" "
To fill average bathtub	30	" "
To flush water closet	4-6	" "
Continuous flowing drinking fountain	50	" Hourly
For each shower bath	30	" per Bath
For sprinkling (½ in. nozzle)	250	" per Hr.
For sprinkling (¾ in. nozzle)	300	" per Hr.
(10 gal. will sprinkle and soak 100 sq. ft.)		
Family of six, household use only	150	" "
Household use (family of six), 8 horses, 12 cows, 20 hogs, and 10 sheep	600	" "
Each horse	10	" "
Each steer or cow	12	" "
Each milk producing cow	25-30	" "
Each hog	2½	" "
Each sheep	1½	" "
Each 100 chickens	2½	" "

the comforts, pleasure and satisfaction that the user of a water system enjoys, he cannot afford to be without one.

Requirements

1. You must have a good and reliable source of water supply.

2. Pump must be of such capacity as to be able to handle the requirements.

3. Motor must be of sufficient power and of proper characteristics to satisfactorily operate the pump.

4. Tank must have ample storage capacity to provide for the needs of the maximum requirements.

5. Proper installation is another important factor.

The source of supply for a water system may be a well, cistern, lake or stream; or the water system may be used to boost the pressure on the city water main where such is not sufficient. Pump should be placed as close to the source of supply as is possible.

For an electric motor driven system specify a pump having a capacity of at least one-half of the daily water consumption. In this way the motor runs only about 2 hours a day and insures years of satisfactory operation. You should sell the motor driven unit with automatic starting and stopping features.

To arrive at the proper size tank for installations, refer to the table above for the total daily water consumption. To determine the amount of water that will be required per day the above table of average quantities required for various uses in the home and for live stock is presented.

To determine the average number of pumping hours daily, divide the pump capacity into the average daily consumption.

Pressure tank capacities normally range from 30 to 220 gallons. A 42-gallon galvanized tank is most commonly used as it supplies a reliable air cushion for the pump and the pressure switch to operate against. This size tank seems to fit most conditions.

Goulds to Exhibit Irrigation Pumps

Pumps for irrigation and farm water systems will be the leading feature of Goulds Pumps, Incorporated, at the Pennsylvania Farm Show at Harrisburg, Pa., January 19 to 23, 1931, according to J. B. Trotman, Manager of Goulds Philadelphia office.

After going through the long drought of 1930, the farmer realizes the value of a plentiful water supply, and it is believed that the farmer will be more interested than ever in water supply systems and pumps.

The Gould exhibit at the farm show will include both shallow and deep well water system pumps, small centrifugal pumps, deep well cylinders, standard rotary pumps and the Gould "Minute Man" Cellar Drainer.

A Problem

"Have you got a match?"

"No, but here's my new cigarette lighter."

"How the deuce can I pick my teeth with a cigarette lighter?"

Missouri Second Electrification Short Course

More than fifty representaitves of power companies, manufacturers and agricultural engineers were in attendance at the second annual farm electrification short course held at the College of Agriculture, Columbia, Missouri, November 20-22, 1930.

A number of the subjects were discussed, including the following: "Finding and Making Use of Facts Pertinent to Farm Electrification in Indiana," presented by Prof. T. E. Hienton, Purdue University, Lafayette, Ind.; "The Application of Motors and Control of Farm Machinery," by H. H. Hemker, General Electric Company, Kansas City, Mo.; "Farm Business as Viewed by the Electric Power Company in the Middle-west Division N. E. L. A.," by W. D. Fleming, Dist. Mgr. Kansas City Power & Light Co., Overland Park, Kans.; "Milk Production Problems on the Dairy Farm," by Prof. A. C. Ragsdale, Chairman, Dairy Husbandry Department, University of Missouri; "Selling and Servicing Farm Electric Equipment," by C. J. Prashaw, Commercial Manager, Missouri Power & Light Co., Kansas City, Mo.; and addresses by W. T. McCaskey, Manager, Rural Service Dept., Middle West Utilities, Chicago, and Jesse Blythe, Ass't. Secretary, Mo. Assn. Pub. Utilities.

N. E. L. A. Farm Equipment Committee Meets

THE first meeting of the newly organized N. E. L. A. Farm Equipment Committee was held at the Chicago Lighting Institute on Nov. 20th. The scope of other N. E. L. A. Committee and organization work was discussed in order to insure the elimination of any possible duplication of work.

Chairman H. E. Dexter pointed out that probably one of the greatest things holding back the development of the farm load is the design and promotion of suitable equipment by the manufacturers. As a result of the discussion it was brought to light that two

A Group of Missouri Electrification Delegates

Left to right—Top row: H. H. Bogue, W. Earle Dye, Dee Mosby, Ben Slusher, Ferd Bates, W. R. Burton, V. E. O'Donnell, J. H. Barns, C. J. Brashaw, D. W. Maupin, J. C. Woley. Third row: T. E. Hienton, W. D. Fleming, Jesse Blythe, W. W. Harvey, O. T. Lewis, Roy Durham, A. H. Pratt, E. H. Stephens, T. H. Lowrance, Joseph M. Deal, E. L. Foggin, Irl E. Elliott, H. G. Campbell, Paul Hansell. Second row: Thorne Browne, W. L. Jones, H. H. Hemker, L. J. Edmonston, E. R. Hare, E. S. Rehagen, L. D. Breyfogle, Jr., J. W. Sawyer, Clote Cox, J. F. Duncan, Tom Anselm, N. B. Inman. Front row: R. W. Oberlin, M. M. Jones, S. B. Shirky, Ralph Parks, G. E. Weaver, James Chapman, Harry Barton

things which the electric companies were most interested in are (1) a complete list of approved equipment which power companies could go out and sell with reasonable assurance that it would satisfactorily meet the needs of the farmers and (2) information on the half dozen best rural selling jobs that were being done in the field, together with the plan and policies of these same companies. Manufacturers, on the other hand, explained that one reason why their companies were not willing to spend more money in developing satisfactory electrical equipment was due to a lack of appreciation of what this market really amounted to. They explained that there was a great need for a complete market analysis showing the potential market for the many kinds of electrically operated equipment proven practical for farm use.

In order to make the work of the Committee effective to the companies at the earliest possible date, the Committee asked the publishers of "Electricity on the Farm" to issue a list of the various types of farm equipment which they had found, from the circulation of a questionnaire to power company representatives and agricultural college leaders, to give satisfactory operation. This list will give the name of the equipment, the manufacturer, and number of individual representatives reporting satisfactory operation in their territory.

This list, while not complete, is now available upon request of the publishers of "Electricity on the Farm." Suggestions for further listings or corrections to this list are solicited as it is the intention of the publishers of "Electricity on the Farm" to issue revised bulletins periodically.

In addition to this, the N. E. L. A. Rural Service Committee will be asked to expedite their activities on a similar list of equipment which they are now preparing.

Dr. E. A. White, Director of the C. R. E. A., and a member of this Committee, explained the "Bureau of Equipment Information" which that organization has been building up. A complete record of all tests and reports on equipment operation will be maintained by this Bureau, which information will be available for the asking. The Committee urged Dr. White to push this work as rapidly as possible and offered, should it be necessary, to recommend to the N. E. L. A. that they provide sufficient additional funds to insure the carrying out of this important work.

The Committee also plans a report of the policies, methods and results of some half dozen of the most successful companies developing rural load. These companies will, if possible, be so selected as to make them of nation-wide interest.

The question of a market analysis showing the potential sales for farm equipment throughout the country will be taken up further at the next meeting, after the Chairman makes some preliminary investigations and finds out just what information can be obtained from the Department of Commerce.

The personnel of this Committee is as follows:

Mr. H. E. Dexter, Chairman, Central Hudson Gas & Electric Corp.

Mr. Verne Stambaugh, Public Service Co. of Colorado, representing the Rocky Mountain Section, N. E. L. A.

Mr. H. S. Hinrichs, Kansas Power & Light Co., representing Middle West Section, N. E. L. A.

Mr. E. W. Gatlin, Texas & Light Co., representing Southwestern Section, N. E. L. A.

Mr. C. P. Wagner, Northern States Power Co., representing North Central Section, N. E. L. A.

Mr. Neal D. Herrick, Edison Electric Illum. Co. of Boston, representing the New England Section, N. E. L. A.

Mr. E. C. Stahl, San Joaquin Light & Power Co., representing Pacific Coast Section, N. E. L. A.

Mr. W. G. Plehn, Ohio Elec. Power Co., representing East Central Section, N. E. L. A.

Mr. O. R. Eichenberger, Tennessee Electric Power Co., representing Southwestern Section, N. E. L. A.

Mr. C. V. Sorenson, Utilities Service Co., representing Great Lakes Section, N. E. L. A.

Mr. G. H. Rietz, Central Station Dept., General Electric Co.

Mr. R. C. Cosgrove, Small Elec.

(*Continued on page* 16)

Blue Ribbon Electric Milker

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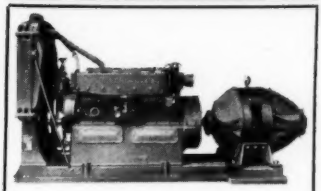

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Farm Committee Meets

(*Continued from page* 14)

Plants Section, Westinghouse Elec. & Mfg. Co.

Mr. O. B. Zimmerman, National Assn. Farm Equipment Manufacturers.

Dr. E. A. White, Committee on Relation of Electricity to Agriculture.

Mr. L. C. Prickett, Committee on Relation of Electricity to Agriculture.

Mr. G. W. Kable, C. R. E. A., College Park, Md.

K. H. Gorham, Electricity on the Farm.

W. T. McCaskey, Middle West Utilities Co.

Electricity for Beginners

The Norman W. Henley Publishing Co., of 2 West 45th St., New York, announce a new book of the above title, by Edward Harper Thomas. This book is an elementary work on electricity, written in non-technical language by Mr. Thomas, who is the author of "Forty Elementary Lessons in Electricity," and was prepared originally for manual training classes in grade schools. The purpose in preparing this book was to make it entertaining as well as instructive, and the publisher feels that the author has succeeded in doing this. The volume contains a great deal of useful information, boiled down in short, easily assimilated form. The student, either of school age, or more mature mind, who wishes to start in the study of electricity in the kindergarten of the subject can do no better than to obtain these instructions to the fascinating science described so ably by Mr. Thomas, by a careful perusal of his interesting work. The book retails for $1.50.

Ward-Love and Permutit Merge

Announcement has been made of the organization of the General Water Treatment Corporation, under Delaware laws as a holding company, to merge the interests of the Permutit Company and Ward Love Pump Corporation.

The Permutit Company, a pioneer in the zeolite water softening field, have twenty-three branch offices, the main one being located in New York City. The main offices of the Ward-Love Pump Corporation are in Chicago, while their two plants are situated at Rockford, Ill. These firms are specialists in equipment for the softening and purification of water and allied chemical lines.

New Master Model Electrochef

A two oven Electrochef, known as the Master Model, is announced by Electromaster, Inc. of Detroit. It is being manufactured and sold to cook for extra large families and for the heavier requirements of restaurants and tea-rooms.

Each oven is separately and automatically controlled, an optional timer controls either oven. There are six heating units on the cooking table each with three heat speeds. All heating elements are identical with those in the Company's standard model "B."

The makers state that this unit is an unusually rapid and compact device, being only 6½ inches in width, and that it will satisfactorily fill the cooking requirements of a family of 15 persons.

The "Little General" Radio

General Motors Radio of Dayton, Ohio have just announced the introduction of the "Little General" in the radio field. This new unit is a small six-tube A.C. screen grid set in three styles of finish, and priced at $57.50 without tubes.

The cabinets for the new set are finished along Gothic lines and the speaker is covered with a specially designed silken fabric; are only 19 inches high, 16 inches wide, 10½ inches deep, and equipped with a tone selector, originally introduced in the cabinet sets of this company.

Trade Literature Received

Small Power Motors. A 14-page circular No. 1883 recently issued by the Westinghouse Electric & Mfg. Co., of E. Springfield, Mass. The motors are described and illustrated. The Sentinal Breaker is also featured in this publication.

Coming Meetings

MISSOURI ASSN. OF PUBLIC UTILITIES. Annual state convention April 16, 17, 18, 1931 at Excelsior Springs, Mo. Jesse Blythe, Assistant Secretary, Merchants Bank Bldg., 103 West High St., Jefferson City, Mo.